LX007
LX007SR

Fingerprint Identification (Proximity / PIN) Access Controller

IDTECK

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1. Important Safety Instructions

When using Fingerprint Identification (Proximity / PIN) Access Controller, you are recommended to follow the basic safety precautions below to reduce the risk of fire, electrical shock, and injury to persons.

1. **Fully** read and understand all instructions and follow them completely.
2. **Follow** all warnings and instructions marked on the product.
3. **Do not** use liquid or aerosol cleaners. Use a damp cloth for cleaning. If necessary, use mild soap.
4. **Do not** use this product near water.
5. **Only** operate this product using the type of power source indicated. If you are not sure of the type of power supplied to your installation site, consult the personnel of local power company.
6. **Never** insert objects of any kind into the product or through the cabinet slots as they may touch voltage points and/or short circuit parts possibly resulting in fire or electric shock.
7. **Never** spill liquid of any kind on the product.
8. **Never** disassemble this product by yourself; take the unit to a qualified service center whenever service or repair is required. Opening or removing the covers may expose you to dangerous voltages or other risks. Also, incorrect reassembly can cause electric shock when the unit is subsequently used.
9. **Unplug** this product from the Direct Current (DC) power source and refer to qualified service personnel under these conditions:
    a. When the power supply cord or plug is damaged or frayed.
    b. If liquid has been spilled on the product.

c. If the product does not operate normally after following the operating instructions in this manual, adjust only those controls that are covered by the operating instructions in this manual. Improper adjustment of other controls that are not covered by this manual may damage the unit and will often require extensive work by a qualified technician to restore normal operation.

d. If the product exhibits a distinct change in performance.

2. General

The **IDTECK LX007 / LX007SR** is ideal to use for Single Door Access Control and Time & Attendance. The **IDTECK LX007 / LX007SR** has 4 input ports, 2 Form-C relay outputs, 2 TTL outputs, an RS232/RS485 communication port and an optional TCP/IP communication port to meet various customer requirements.

This user-friendly device allows you to register up to 1,000 Fingerprint Users (Optional 2,000/4,000 Fingerprint Users) and can store up to 10,000 IDs and 20,000 event transactions. All events can be uploaded and saved to the database of the host PC and the software can create a report in MS-Excel, HTML and Text format files for Time & Attendance management purposes.

The **IDTECK LX007 / LX007SR** has a built-in Fingerprint Module, a proximity card reader with IDC 26bit Wiegand format and a 24-key keypad (10 numeric keys, 2 control keys and 12 function keys) for a wide range of applications. The **IDTECK LX007 / LX007SR** controls access of users with any selected combination of fingerprint, Proximity Card/PIN and/or password. The **IDTECK LX007 / LX007SR** has 4 external input ports to be connected to an exit button, a motion detector, a door contact sensor and an existing alarm system to prevent unauthorized access.

The **IDTECK LX007 / LX007SR** has 2 relay outputs to control a door lock and an alarm relay that is used to warn errors. The graphic LCD supports multiple languages so that the unit can be operated anywhere in the world.

All system settings can be configured using the front keypad or via the Windows-based software. The **IDTECK LX007 / LX007SR** is a cost-effective biometrics system that can be used stand-alone or networked. The dual tamper switches prevent unauthorized access.

3. Features

• 125KHz(default) Proximity/13.56MHz(optional) Contactless Smart Card,
  PIN and Fingerprint Recognition
• Dual function for Access Control and Time & Attendance
• 1:1 Verification and 1:N Identification
• 2 Fingerprint Templates per User
• Auto Touch Sensor for Fingerprint only Identification
• Fingerprint quality display
• 1,000 / 2,000 / 4,000 Fingerprint Users
• 10,000/20,000 ID Users / 20,000/10,000 Event Buffers (Selectable)
• Registration of up to 10 Fingerprint Master IDs
• Operating Mode selectable for Individual IDs
• 4-Level Door Open Time Setting for Individual IDs
• Time Schedule Setting for Individual IDs and for Input Port, Output Port, Voice Message and Reader Mode
• Network Communication via RS232, RS485 and built-in TCP/IP
• 26bit Wiegand Output (34bit for LX007SR)
• Serial Printer Port for event ticket issuing
• Input Cut-off Check
• User Name & Function Key Definition Display on LCD
• ARM/DISARM Function for Alarm Panel
• 2 Men Operation Mode
• Duress Alarm Function
• Graphic LCD of Multi Languages Display
• Voice Guide Programmable for Other Language
• Voice announcement Programmable by user via serial communication
• Door Phone Function (Optional)
• Software Selection: STARWATCH TIME PRO 2006, LX ACCESS PRO II

4. Specification

Model			LX007
CPU			32bit ARM9, 8bit and 16bit Microprocessor
Memory	Fingerprint Module	Program Memory	128KByte ROM
		Data Memory	128KByte / 256KByte / 512KByte Flash Memory
	Controller	Program Memory	256KByte ROM
		Data Memory	512KByte Flash Memory
Fingerprint User			1,000 / 2,000 / 4,000 Fingerprint Users
Fingerprint Templates Size			800 Bytes for 2 Fingerprint Templates
ID User			10,000 / 20,000 Users (Selectable)
Event Buffer			20,000 / 10,000 Event Buffers (Selectable)
Read Range		Passive Type	IDK50 / IMC125 : Up to 2 inches (5cm) IDC80 / IDC170: Up to 4 inches (10cm) IDA150 / IDA200 compatible
		Active Type	
Reading Time (Card)			30ms
Verification Time			Less than 1sec.
Identification Time			Less than 2sec.
Power / Current			DC 12V / Max.650mA
External Reader Port			**LX007:** 1 Port (26bit Wiegand, 4 / 8bit Burst for PIN) for Anti-Pass Back **LX007SR:** 1 Port (34bit Wiegand, 4 / 8bit Burst for PIN) for Anti-Pass Back
Communication			RS232 / RS485 (Max.32ch) TCP/IP (Internal LAN Converter Required/Optional)
Baud Rate			19,200bps (recommended) / 9,600bps / 38,400bps / 57,600bps (selectable)
Input Port			4 Ports (Exit Button,

		Door Sensor, Aux# 1, Aux#2)
Output Port		2 Ports (2 FORM-C Relay Output (COM, NO, NC) / DC12V-18V, Rating Max.2A)
		2 Ports (TTL Output / DC5V, Rating Max.20mA)
LCD		Graphic LCD (128 x 64 dots) 72.5mm x 39.5mm (2.85″ x 1.56″) Screen
Keypad		24-key Keypad with Back Lighting (12 Function Keys included)
Language	LCD Display	English, Spanish, Portuguese (Selectable) Arabic, Chinese, Korean, Japanese (Optional)
	Voice Output	English, Spanish, Portuguese, Arabic, Chinese, Korean, Japanese (Programmable)
LED Indicator		3 Array LED Indicators (Red, Green and Yellow)
Beeper		Piezo Buzzer
Operating Temperature	Fingerprint Module	-15° to +40°C (+5° to +104°F)
	LCD	0° to +50°C (+32° to +122°F)
	Controller	-15° to +70°C (+5° to +158°F)
	RF Reader	-35° to + 65°C (-31° to +149°F)
Operating Humidity		10% to 90% relative humidity (non-condensing)
Color / Material		Black, Red, Gray, Silver, Dark Gray, Gold, Black & Gold Combo / Polycarbonate
Dimension (W x H x T)		192mm x 160mm x 45mm (7.56″x6.29″x1.77mm)
Weight		800g(1.76lbs)
Certification		FCC, CE, MIC

Fingerprint Module Specifications

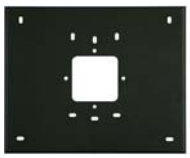
Resolution	500dpi
Capture Image Size	412 X 302 pixels
Extraction Image Size	260 X 300 pixels
Sensing Area	13mm X 15.2mm
Scanner	High Quality Optical Sensor
FAR(False Acceptance Ratio)	0.001%
FRR(False Reject Ratio)	0.1%
ESD(Electro Static Discharge)	15KV
Verification Time	Less than 1 sec.
Identification Time	Less than 2 sec.

5. Identifying Supplied Parts

Please unpack and check the contents of the box. If any of these parts are missing, please contact a near-by distributor or IDTECK as soon as possible.

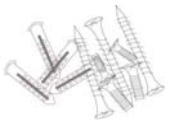
Main Unit

1 Unit



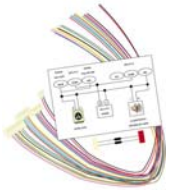
Wall Mount

1 PC



Screws

3x8mm – 1 PC
3.5x12mm – 4 PCS
3.5x40mm – 4 PCS



Cable & Diode & Resistor

Cable – 6 PCS
Diode – 2 PCS
Resistor – 4 PCS

User's Manual

1 Copy

6. Product Overview

6.1 Features

Standalone Operation

The **IDTECK LX007 / LX007SR** is capable of having an external reader (for 1 Door Control). This biometrics access controller reads card ID numbers and determines whether to allow or deny access to the door. When an input signal is received, for example from a sensor activated or an exit button pressed, the controller generates and logs an appropriate response. All events are stored into the memory buffers. The access controller is a true standalone device that, in the event of malfunction, will not affect other units when used in conjunction with one another.

Operation with Host PC

All event transactions can be managed via the host PC. The data transmitted from the controller can be displayed and stored on the host PC.

Keypad

If the **IDTECK LX007 / LX007SR** is not connected to the host PC, the built-in keypad and LCD module can be used for the entire operations and configuration process.

Input / Output

The **IDTECK LX007 / LX007SR** has 4 built-in input ports and 4 output ports (2 relay outputs and 2 TTL outputs) which can be used to manipulate a wide variety of controls.

Time Schedule Setup

You can program up to 10 time schedules and assign one time schedule to each user. Each time schedule has 8 different time zones from Monday-Sunday (7 time zones) and one holiday. Each time zone has 5 different time codes so you can program 5 different time codes for each day. You can also program time schedules for individual inputs and outputs. That is, if a time schedule for an input device is activated, that input device will be working only during the time assigned by that time code. Each time schedule is linked to one holiday schedule.

Holiday Schedule Setup

Excepting Sunday, you can program 100 holidays to one holiday schedule. Each holiday schedule is linked to one time schedule which has a time code for holidays. You can program all holidays to a holiday schedule and the time code for holidays is programmed to be the holiday time zone of time schedule.

Example : **A.** Holiday schedule 01 linked to time schedule 01, Holiday schedule 02 linked to time schedule 02

B. Holiday schedule 02 linked to time schedule 01, Holiday schedule 01 linked to time schedule 03

Forced Door Open Alarm

When the door is opened by force, the door contact sensor will be activated. For this application, you have to install the door contact sensor and properly set the door contact time and outputs to the alarm devices. The Forced Door Open Alarm will be generated until the alarm is disconnected.

Door Open Timeout Alarm

The Door Open Timeout Alarm will be generated when the door is open for longer than a certain time limit, even after the door is opened followed by a normal authentication process. The Overtime Door Open Alarm will continue to ring until the door is closed.

Anti-pass Back

If an additional proximity reader is used, the Anti-pass back mode can be applied. In the Anti-pass back mode, a user is not allowed to enter or exit when the user violates the one entry/one exit rule. For example, an identical user won't be able to enter if he or she previously exited the door without going through a proper authentication process.

Duress Alarm

In case of duress, enter the 2-digit Duress Password and press the <ENT> key before the normal access process. The door can be opened as usual, but the duress alarm is also generated at the same time. The duress alarm output

will be sent to the TTL output and an alarm event will be sent to the host PC.

ARM / DISARM Function for Alarm Panel

While a device is in the ARM condition, its reader ports are all frozen and inputs to the ports are not processed so that no one can get access to the door. When this mode is applied, the **IDTECK LX007 / LX007SR** sends signals to other connected security devices so that they can function accordingly.

Two Men Operation

This feature is used to configure the **IDTECK LX007 / LX007SR** to allow a certain user (e.g. a visitor) to pass the door only when that user is accompanied by another special user (e.g. a guide). Both of the visitor and the guide should be authorized together for access.

4 Level Individual Door Opening Time Setting

This feature is used only for setting four different door opening times.

Name Display

The **IDTECK LX007 / LX007SR** can display the user name when a user gains access.

Function Key Name Display

You can assign names for each function key via software. Using this feature, for example, you can give certain keys names like punch-in and punch-out and tell the employees to press one of the function keys according to the nature of their access prior to each access attempt. This way, you will be able to identify punch-in and punch-out events on the software.

6.2 Product Explanation

6.2.1 Panel Description

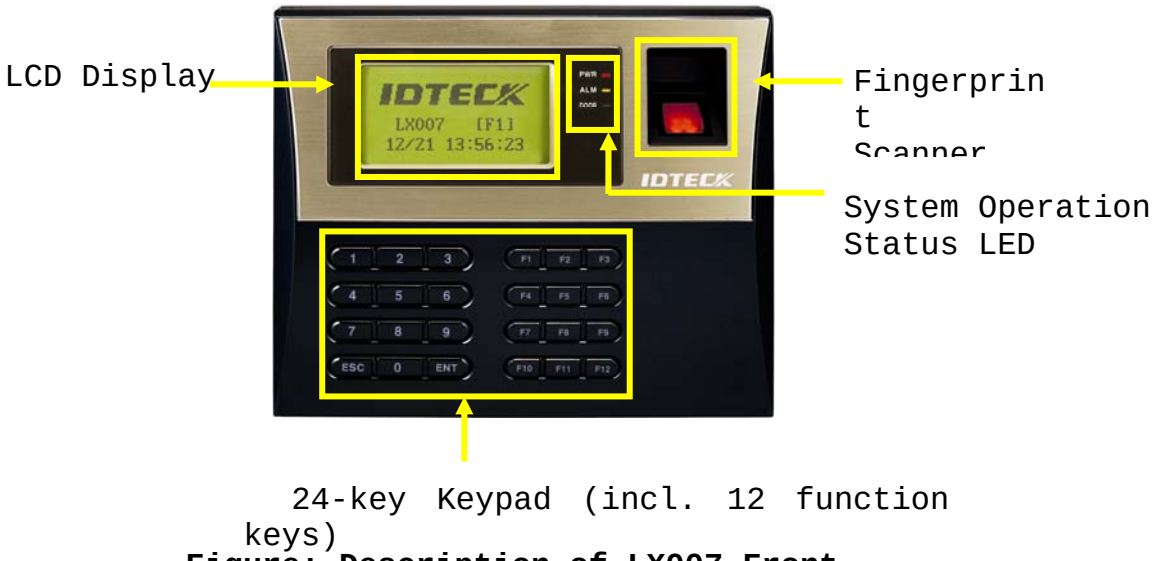


Figure: Description of LX007 Front Panel

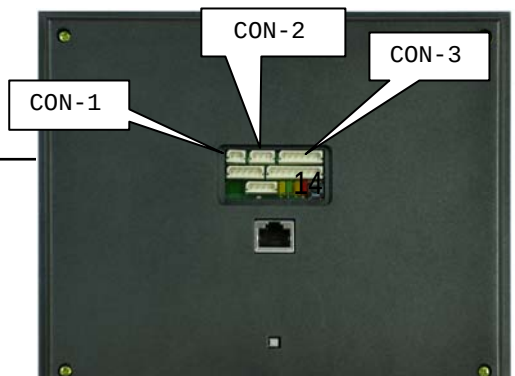
- *LCD Module:* The LCD screen displays the status of the LX007.
- *System Operation Status LED:*

  When the power is applied to the LX007, the red LED is turned on.

  When the Relay #1 operates, the green LED is turned on.

  When the Relay #2 operates, the yellow LED is turned on.
- *24-key Keypad:* The keypad can be used to manually operate the LX007 with ease.
- *Function Keys:* The LX007 has 12 function keys ([F1] - [F12]).

6.2.2 Connection Layout



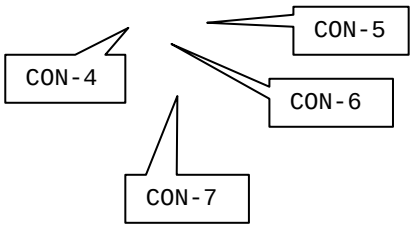


Figure: Connector Layout

6.2.3 Color Coded & Wring Table

I/O PORT NAME	SIGNAL NAME	WIRE COLOR
CON-1(2PIN CONNECTOR)		
Main Power (+12V)	DC 12V	Red
Power Ground	GND (-)	Black
CON-2 (3PIN CONNECTOR : Serial Printer)		
RS232-RX	RXD	Pink wire with white stripe
RS232-TX	TXD	Cyan wire with white stripe
RS232-GND	GND	Black
CON-3 (6PIN CONNECTOR)		
TTL OUTPUT #1	TTL#1, WD0	Orange wire with white stripe
TTL OUTPUT #2	TTL#2, WD1	Brown wire with white stripe
Aux Input #1	IN#1	Green
Aux Input #2	IN#2	Green wire with white stripe
Wiegand DATA 0	DATA-0	Pink
Wiegand DATA 1	DATA-1	Cyan
CON-4 (5PIN CONNECTOR)		
RS485-RTX(+)	RS485-A(+)	Yellow wire
RS485-RTX(-)	RS485-B(-)	Gray wire
RS232-TX	TXD	Black wire with white stripe
RS232-RX	RXD	Red wire with white stripe
RS232-GND	GND	Black
CON-5 (8PIN CONNECTOR)		
Door RELAY(NC)	NC(1)	Blue wire with white stripe
Door RELAY(COM)	COM(1)	Gray wire with red stripe
Door RELAY(NO)	NO(1)	White wire with red

		stripe
Alarm RELAY(NC)	NC(2)	Purple wire with white stripe
Alarm RELAY(COM)	COM(2)	White
Alarm RELAY(NO)	NO(2)	Purple
Exit Button	EXIT	Orange
Door Sensor	CONTACT	Yellow wire with red stripe
CON-6 (4PIN CONNECTOR : Door Phone (Optional))		
DP_VCC		Orange wire with red wire
DP_GND		Orange wire with black stripe
DP_D0	DATA-0	Blue
DP_D1	DATA-1	Brown
CON-7: TCP/IP RJ45 CONNECTOR		

7. Installation Tips & Check Point

7.1 Check Points before Installation

7.1.1 Selection of Cable

The system installation cables should be connected as follows;

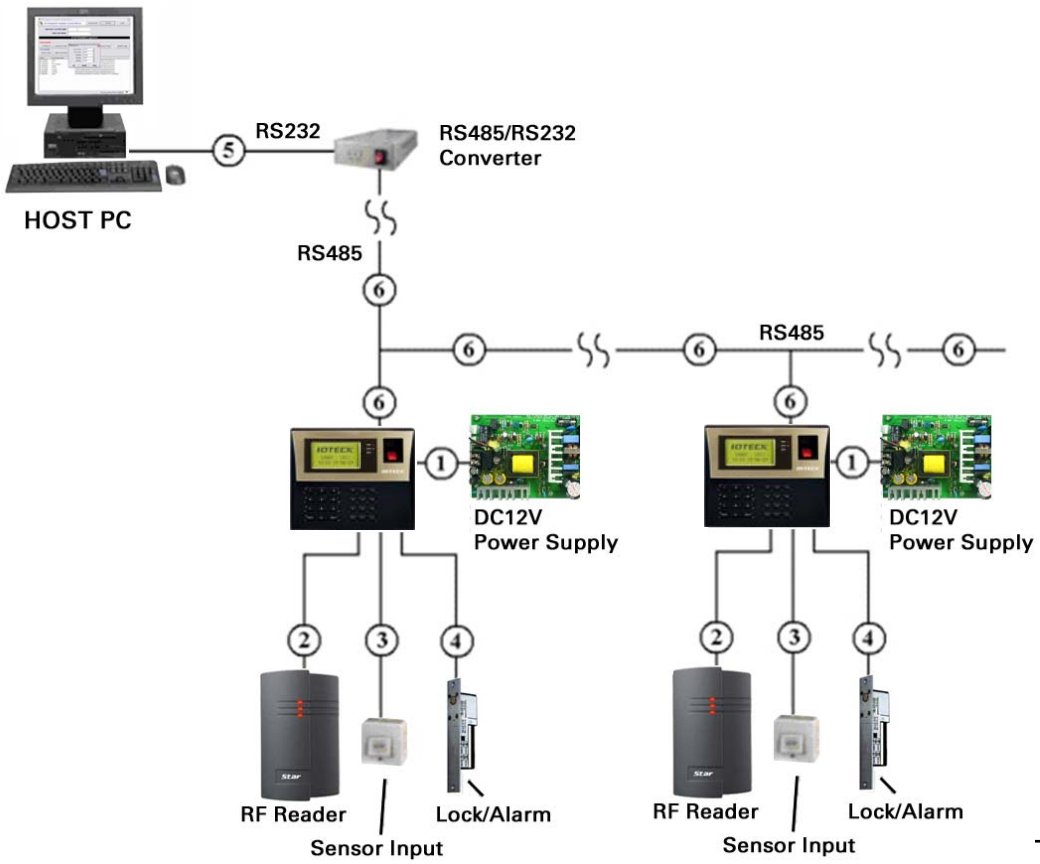


Figure: System Installation Layout

7.1.2 Recommended Cable Type and Permissible Length

Reference	Description	Cable Specification	Maximum Distance
1	LX007 Power (DC12V) DC Power -> LX007	Belden #9409, 18 AWG 2 conductor, unshielded	30m
2	Reader (Power and Data) Exit Reader -> RF20	Belden #9512, 22 AWG 4 conductor, shielded	150m
		Belden #9514, 22 AWG 8 conductor, shielded	
3	Door Contact Exit Button Sensor Input Input -> LX007	Belden #9512, 22 AWG 4 conductor, shielded	300m
		Belden #9514, 22 AWG 8 conductor, shielded	
4	Door Lock, Alarm Device Lock (Alarm) -> LX007	Belden #9409, 18AWG 2 conductor, unshielded	300m
5	RS232 Cable Converter -> Host P.C.	Belden #9829, 24 AWG 2-twisted pair, shielded	15m
6	RS485 Cable LX007 -> LX007 LX007 -> Converter	Belden #9829, 24 AWG 2-twisted pair, shielded	1,200m

+ ***: Thicker wires are needed if you connect a reader with high current consumption.***

7.2 Check Point during Installation

7.2.1 Termination Resistor

Termination resistors are used to match impedance of the network to the impedance of the transmission line being

used. When impedance is mismatched, the transmitted signal is not completely absorbed by the receiver and a portion of signal is reflected back into the transmission line. The decision whether or not to use termination resistors should be based on the cable length and data rate used by the communication system.

For example, if you use 9,600 baud rate and 1,200m length of cable, the propagation velocity of cable is 0.66 x speed of light (This value is specified by the cable manufacturer), if we assume the reflections will damp out in three round trip up and down the cable length, the transmitted signal will stabilize 18.6us after the leading edge of a bit. Since the data bit is captured in the middle of the bit which is approximately 52us after the leading edge of a bit. The reflection stabilizing time 18.6us is much before the center of the bit therefore the termination resistors are not required.

However, if you install the cable to maximum length, the impedance of cable and network is mismatched and the transmitted signal is overlapped by the reflected signal. In this case, it is recommended to add termination resistors to the end of the receiver lines. A 120Ω resistor can be used for termination resistor in parallel between the receiver lines “A” and “B” for 2 wires RS485 system. A termination resistor of less than 90Ω should not be used and no more than 2 terminations should be used in one network system.

7.2.2 How to Connect Termination Resistors

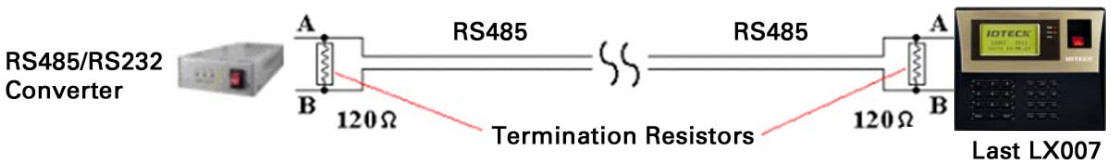


Figure: Termination resistors for 2 wire RS485 communication system

7.2.3 Grounding System for Communication Cable

We recommend you to use a proper grounding system for the communication cables. The best grounding method is to put the shield wire of the communication cable to the 1st class earth grounding; however bringing the earth ground to the communication cable isn’t easy and the installation cost increases. There are three grounding points you can find during installation;

1. Earth Ground **2.** Chassis Ground **3.** Power Ground

The most important point about grounding system is not to

connect both ends of shield wires to the grounding system; in this case, there will be a current flow through the shield wire when the voltage level of both ends of shield wire is not equal and this current flow will introduce some noise and interference to communications. For better grounding, we advise you connect ONLY one end of shield wire of communication cable to the grounding system; If you find earth ground nearby, then connect one end of the shield wire to the earth ground; If you do not have earth ground nearby, then find chassis ground and connect one end of shield wire to chassis ground; If you do not find either earth ground or chassis ground, then connect one end of shield wire to power ground. (GND of LX007) Note that if the chassis ground is not properly connected to the earth and floated from the ground level, then grounding to the chassis ground will give the worst communication. Therefore, we recommend you use power ground instead of chassis ground if that is the case.

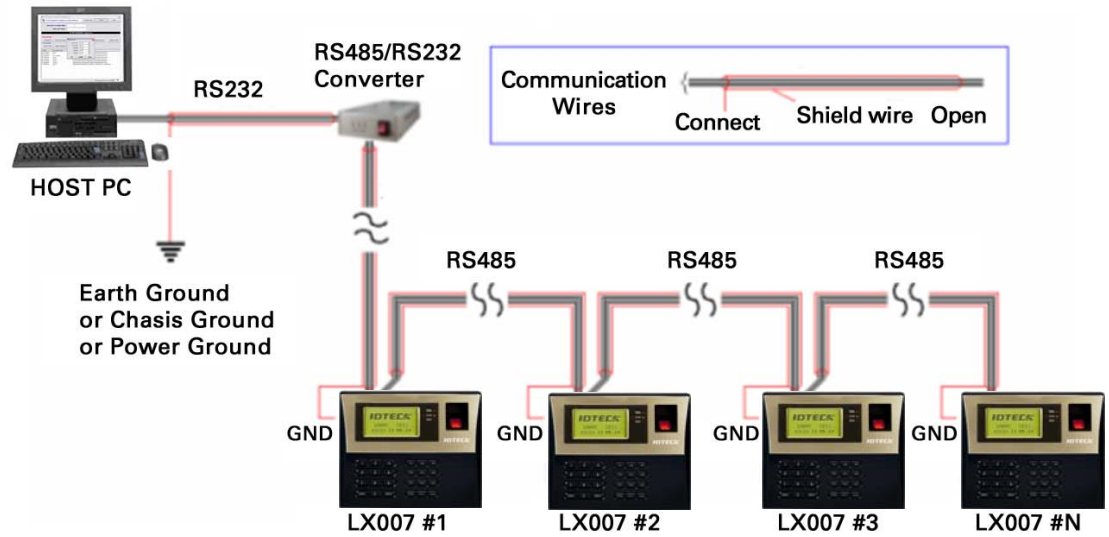


Figure: Grounding system

7.2.4 Reverse Diode Connection

If you connect an inductor (Door Locks or Alarm device) to the output relays, there will be a high surge voltage created while the inductor is turning on and off. If you do not connect a reverse diode, the surge voltage will transfer and damage the electronic circuit of the controller. It is strongly recommended to add a reverse diode between the inductor coils to absorb this surge voltage.

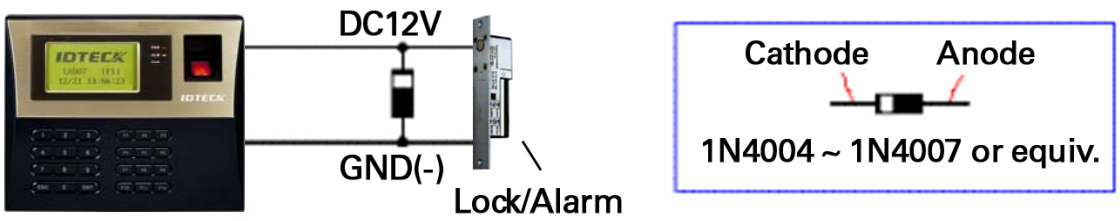


Figure: Reverse Diode Connection

8. Installation of Product

8.1 Wall Mount (Unit: mm)

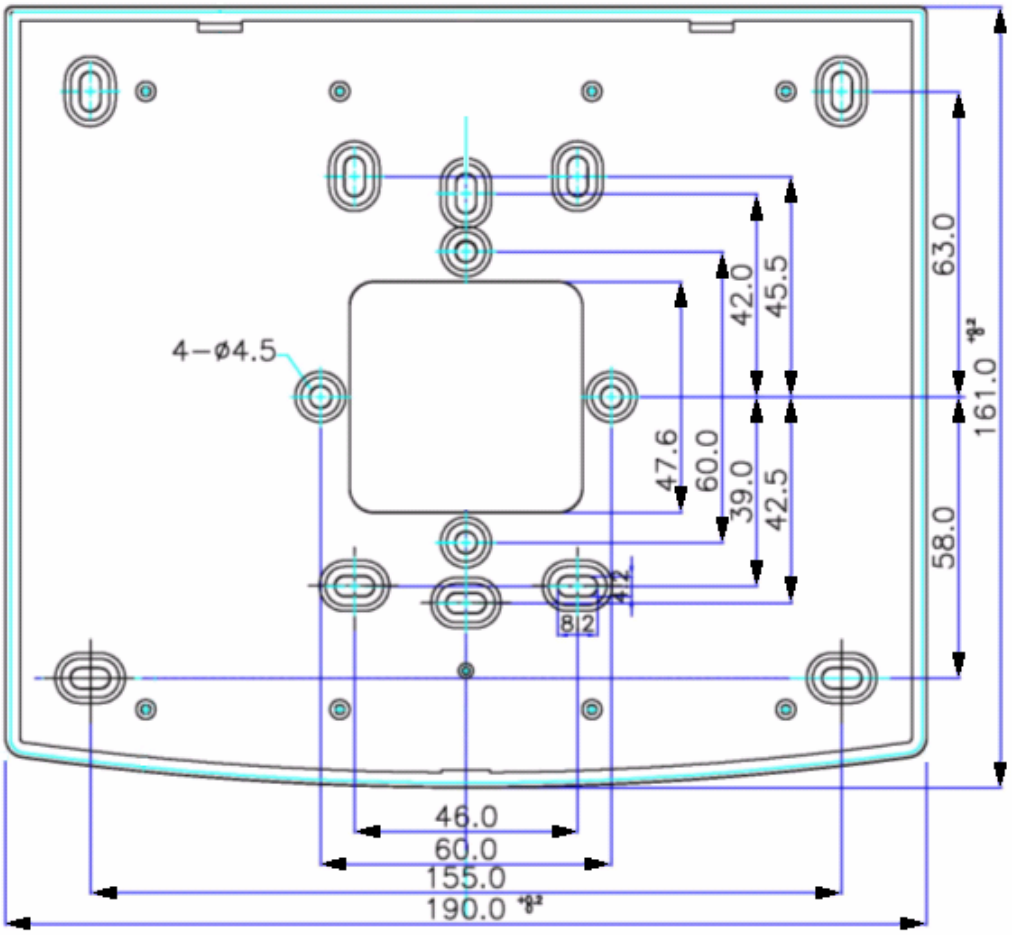
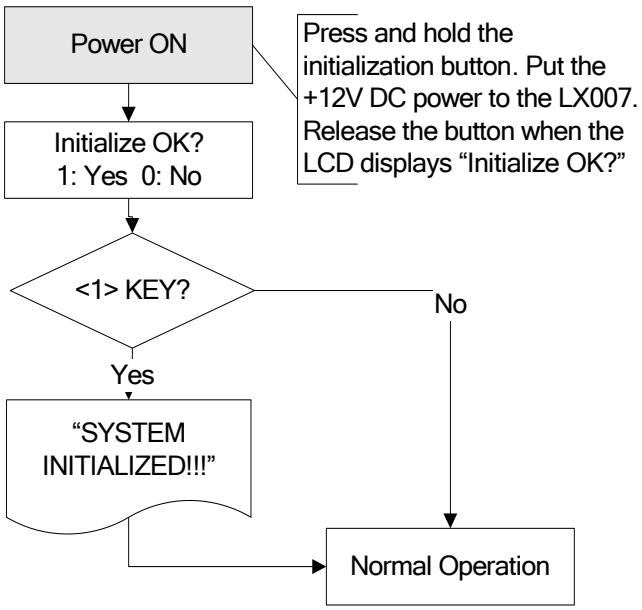


Figure: Wall Mount Layout

8.2 System Initialization

After the installation and connections are completed, apply power (DC12V) to the LX007 with the initialization button held down. (The initialization button can be found on the back of the LX007.) Then, the LCD will first display “**Initialize OK? 1:Yes 0:No**”. Press **<1>** key if you want to initialize the system. After all the initialization process is completed, the system will be operating in the normal mode and the LCD will display “**IDTECK, LX007 [F1], Date Time**”.


Power ON
Press and hold the initialization button. Put the +12V DC power to the LX007. Release the button when the LCD displays "Initialize OK?"
Initialize OK?
1: Yes 0: No
<1> KEY?
No
Yes
"SYSTEM INITIALIZED!!!"
Normal Operation

8.3 Wall Mount Installation

1. Position the Wall Mount to the location at which you want to install the unit and mark 4 x drilling positions. Drill 6-32 holes for at least 4 mounting points.
2. Drill a 1/2" hole on the center of the Wall Mount.
3. Using 4 screws, install the Wall Mount to the proper location.
4. Take out the cable through the center hole.
5. After the wiring is done as explained in the next section, put the Main Unit on the Wall Mount and screw it.

8.4 Wiring

8.4.1 Power Connection

1. Connect (+) wire of DC 12V Power Supply to Red wire.
2. Connect GND (-) wire of DC 12V Power Supply to Black wire.

8.4.2 Input Connection

Exit Button Connection

1. Connect one wire from an Exit Button to Orange wire.
2. Connect the other wire from the Exit Button to GND.

Door Contact Sensor Connection

1. Connect one wire from Door Contact Sensor to Yellow wire with Red stripe.
2. Connect the other wire from Door Contact Sensor to

GND.

Auxiliary Input Connection
(Applicable to Aux Input #1(Green wire), Aux Input #2(Green wire with white stripe))

1. Connect one wire from Auxiliary Input Device to one of Aux Input #1 or Aux Input #2.
2. Connect the other wire from Auxiliary Input Device to GND.

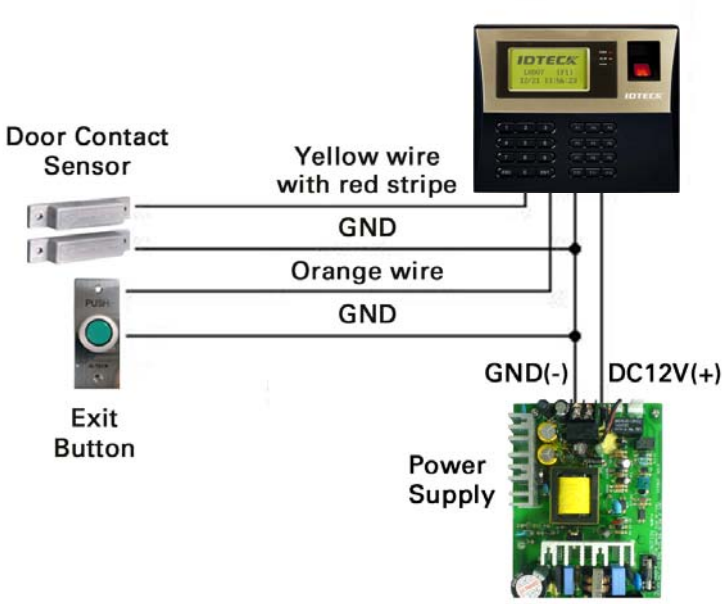


Figure: Input Device Connection

2.2K Resistor Connection for Cut Off Check

You have to connect a 2.2K resistor between the input wire (e.g. Orange wire) and the GND to apply the Cut Off Check feature. First, select whether or not to check the cutoff status of each device from [F5 SETUP MENU] -> Cut Off Check. Second, set the desired output that will be generated in the event of a cutoff from [F5 SETUP MENU] -> Cut Off Alarm.

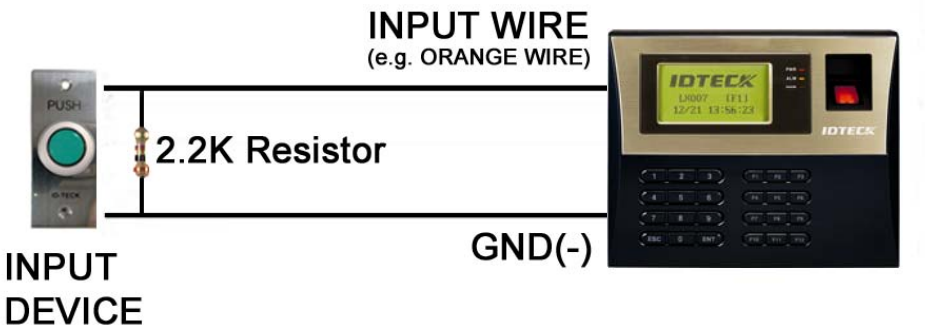


Figure: 2.2K Resistor Connection for Cut Off

Check

8.4.3 Output Connection

Door Lock (Power Fail Safe) Connection (Door Relay)

1. Connect COM wire of Door Relay (Gray wire with Red stripe) to +12V.
2. Connect NC wire of Door Relay (Blue wire with White stripe) to (+) wire of Door Lock.
3. Connect GND wire to (-) wire of Door Lock.

Door Lock (Power Fail Secure) Connection (Door Relay)

1. Connect COM wire of Door Relay (Gray wire with Red stripe) to +12V.
2. Connect NO wire of Door Relay (White wire with Red stripe) to (+) wire of Door Lock
3. Connect GND wire to (-) wire of Door Lock.

Alarm Device Connection (Alarm Relay)

1. Connect COM wire of Alarm Relay (White wire) to +12V.
2. Connect NO wire of Alarm Relay (Purple wire) to (+) wire of Alarm device.
3. Connect GND port to (-) wire of Alarm device.

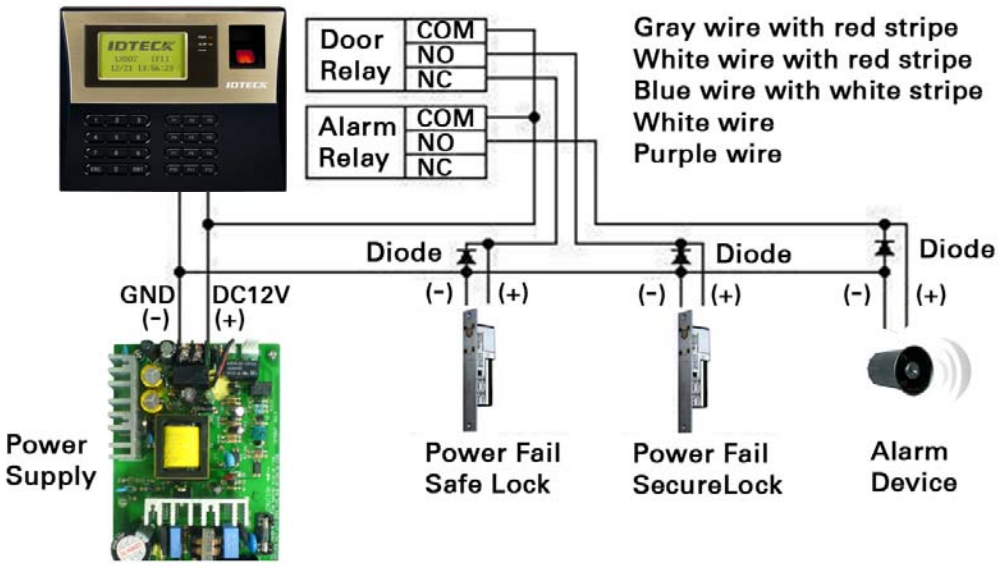


Figure: Door Lock, Alarm Device Connection

CAUTION: You should connect REVERSE DIODES as shown in the diagram above. A desirable DIODE is a Fast Recovery DIODE (current=min. 1A), 1N4004 - 1N4007 or similar.

8.4.4 External Reader Connection

Proximity Reader Connection

1. Connect (+) wire of the Proximity Reader to DC +12V.
2. Connect (-) wire of the Proximity Reader to GND.
3. Connect Data-0 wire of the Proximity Reader to the Pink wire.
4. Connect Data-1 wire of the Proximity Reader to the Cyan wire.

- *Compatible Readers (External Reader):*

LX007:

Standard 26bit Wiegand Format Proximity Readers

Standard 26bit Wiegand + 8bit Burst Format Proximity and keypad Reader

LX007SR:

Standard 34bit Wiegand Format Proximity Reader

Standard 34bit Wiegand + 8bit Burst Format Proximity and keypad Reader

- *Recommended Readers*

LX007: RF TINY, RF10/20/30/70/500, RFK101, FGR006, FGR006EX

LX007SR: SR10/20/30, SRK101, FGR006SRB

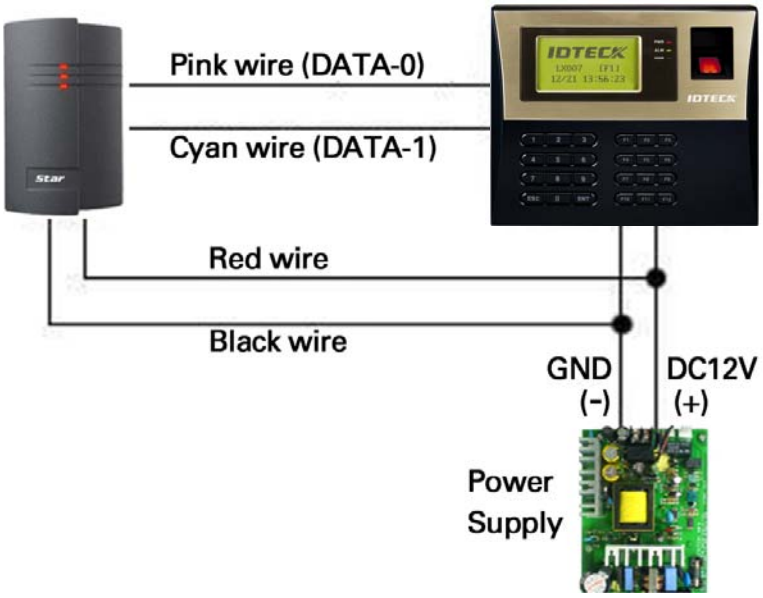


Figure: External Reader Connection

9. Communication

9.1 RS232 Communication Port Connection

A 9-pin connector (Serial communication connector, female) is needed to connect the LX007 with a host PC via RS232 communication.
Please follow the steps below.

1. Connect RS232-TX (Black wire with White stripe) to the pin #2 (RXD) of the 9-pin connector.
2. Connect RS232-RX (Red wire with White stripe) to the pin #3 (TX) of the 9-pin connector.
3. Connect GND (Black wire) to the pin #5 of the 9-pin connector.
4. Plug in the 9-pin female connector to COM Port of the host PC.
5. Install and run the LX007 Application Software.

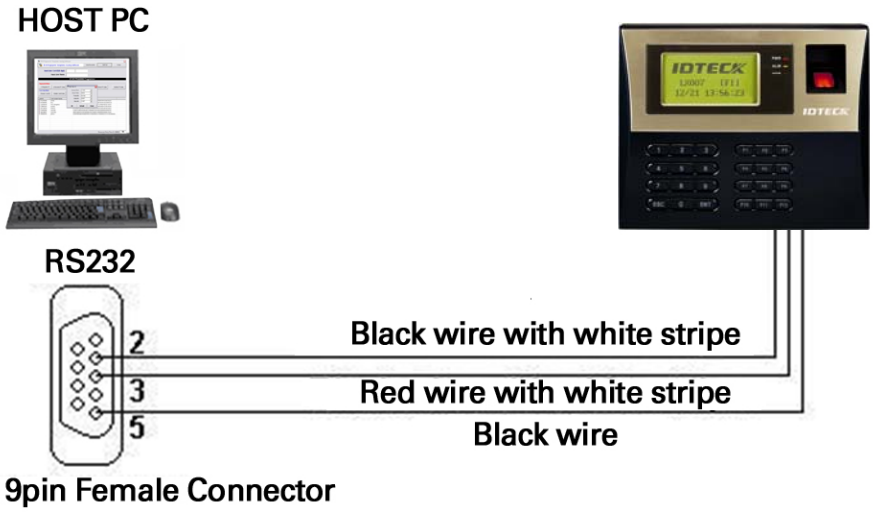


Figure: RS232 Communication

9.2 RS485 Communication Port Connection

9.2.1 RS485 Connection (Standalone Unit)

An RS485/RS232 converter is needed to use the RS485 communication between the LX007 and a host PC. Please follow the steps below.

1. Connect RS485-RTX (+) (Yellow wire) to RS485-A port of the converter.

2. Connect RS485-RTX (-) (Gray wire) to RS485-B port of the converter.
3. Plug the 9-pin connector (RS232) of the converter into the COM Port of the host PC.
4. Install and run the LX007 Application Software.

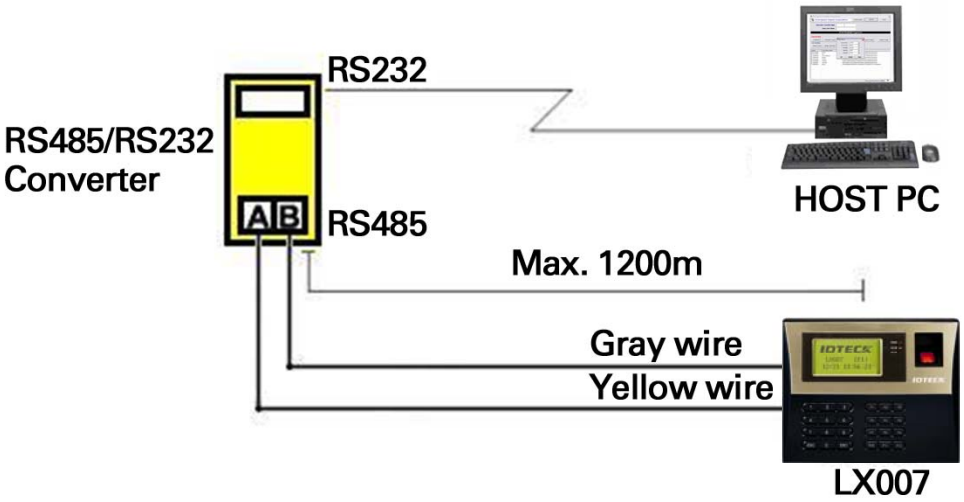


Figure: RS485 Connection between the LX007 and a Host PC

9.2.2 RS485 Connection (Multiple Units)

An RS485/RS232 converter is needed to use RS485 communication between multiple LX007 units and a host PC. Please follow the instructions below.

First, connect all RS485 ports of LX007 units in parallel.
(Max. of 32 LX007 Units can be connected)

1. Connect RS485-RTX (+) (Yellow wire) of one LX007 to RS485-RTX (+) (Yellow wire) of another LX007.
2. Connect RS485-RTX (-) (Gray wire) of one LX007 to RS485-RTX (-) (Gray wire) of another LX007.
3. Set a unique Communication Address for each LX007.

Second, connect one of the RS485 ports of the LX007 units to the RS485/RS232 converter.

1. Connect RS485-RTX (+) (Yellow wire) of one LX007 to RS485-A port of the Converter.
2. Connect RS485-RTX (-) (Gray wire) of one LX007 to RS485-B port of the Converter.
3. Plug the 9-pin connector (RS232) of the Converter into the COM port of the host PC.
4. Install and run the LX007 application software.

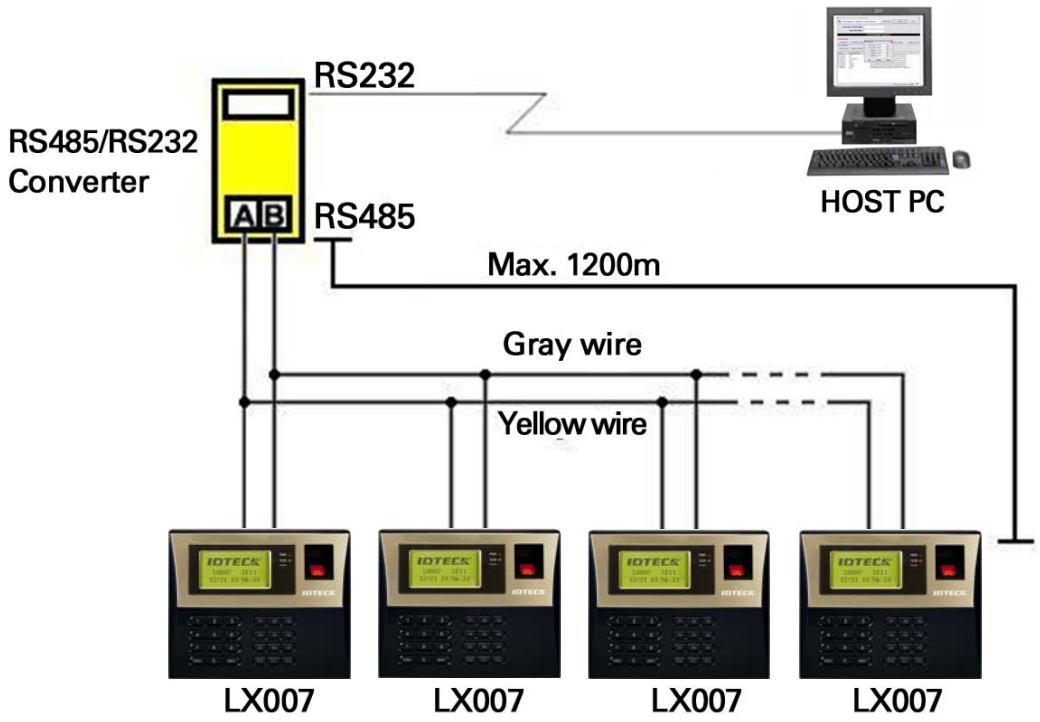


Figure: RS485 Communication between Multiple LX007 Units and a PC

9.3 TCP/IP Communication Port Connection (Optional)

An optional TCP/IP Module is needed for TCP/IP communication to the host PC. Follow the next instruction.

1. Connect the LAN cable of the network system to the RJ45 jack of the LX007.
2. If you install multiple LX007 units and only one TCP/IP port is available, you may connect one LX007 to TCP/IP network and then connect all the LX007 units using the RS485 multiple communication as shown in the diagram below.
3. Set a unique Communication Address for each LX007.
4. Install and run the LX007 Application Software.

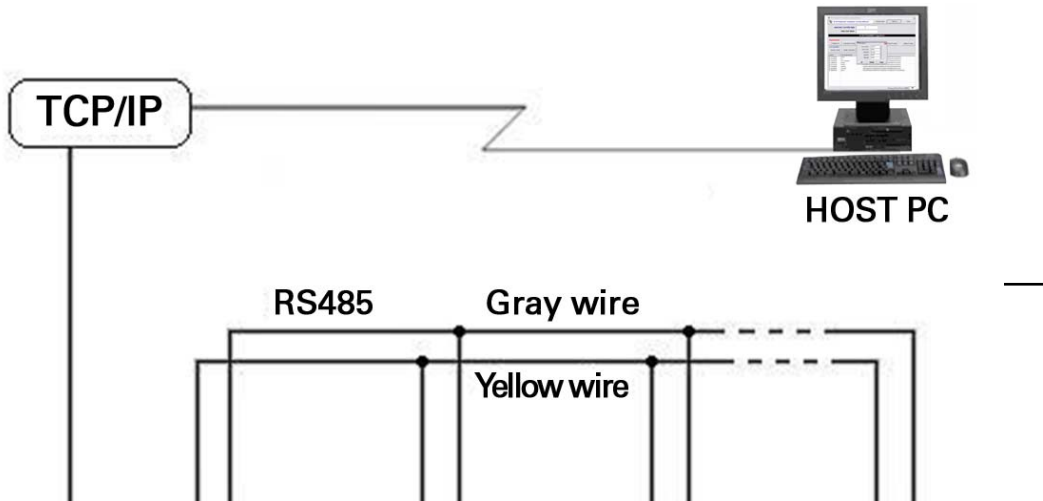


Figure: TCP/IP Communication between Multiple LX007 units and a host PC

9.4 Serial Printer Connection

A 9-pin connector (Serial communication connector, female) is needed to connect the LX007 with a serial printer via RS232 communication. Please follow the steps below.

1. Connect RS232-TX (Cyan wire with White stripe) to the pin #2 (RXD) of the 9-pin connector.
2. Connect RS232-RX (Pink wire with White stripe) to the pin #3 (TX) of the 9-pin connector.
3. Connect GND, Black wire to the pin #5 of the 9-pin connector.
4. Plug in the 9-pin female connector to COM Port of the serial printer.
5. Set the **Print Output** setting to ‘Auto Print’ or ‘Manual Print’ from **[F3 SETUP MENU]**.

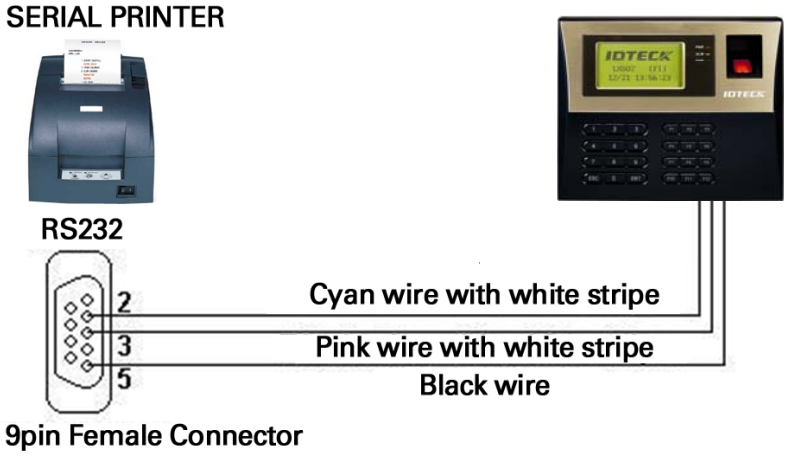
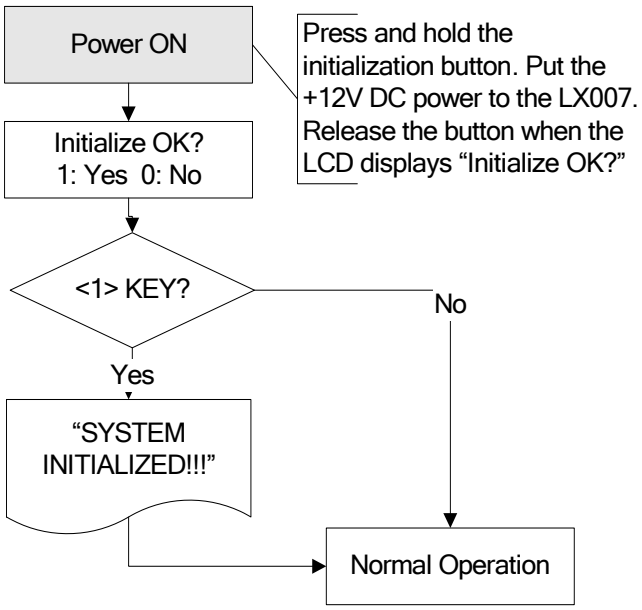


Figure: RS232 Communication between LX007 and a Serial Printer

10. Basic Setting

10.1 Initialization of LX007

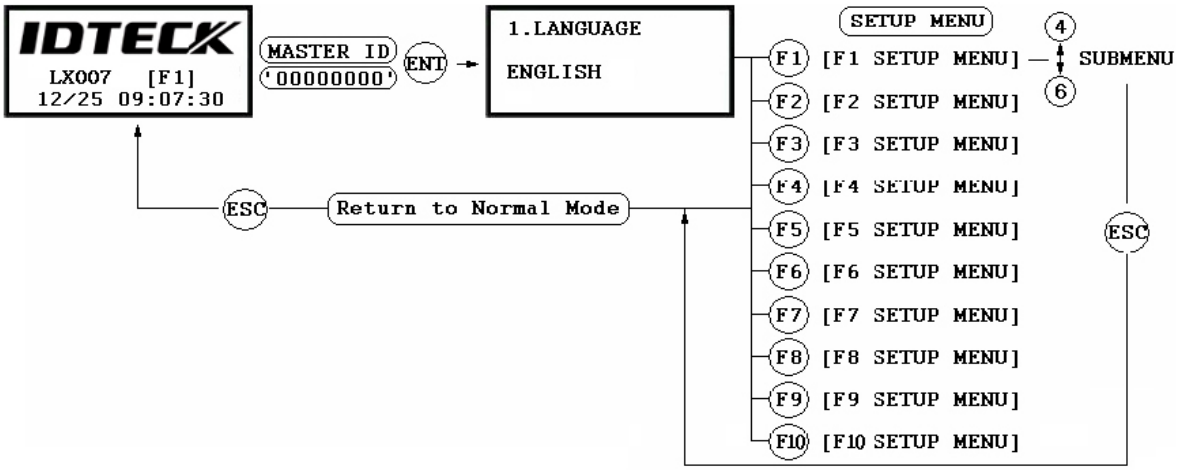
After the installation and connections are completed, apply power (DC12V) to the LX007 with the initialization button held down. (The initialization button can be found on the back of the LX007.) Then, the LCD will first display **"Initialize OK? 1:Yes 0:No"**. Press **<1>** key if you want to initialize the system. After all the initialization process is completed, the system will be operating in the normal mode and the LCD will display **"IDTECK, LX007 [F1], Date Time"**.


Power ON
Initialize OK?
1: Yes 0: No
<1> KEY?
No
Yes
"SYSTEM INITIALIZED!!!"
Normal Operation
Press and hold the initialization button. Put the +12V DC power to the LX007. Release the button when the LCD displays "Initialize OK?"

10.2 How to Enter the SETUP MENU

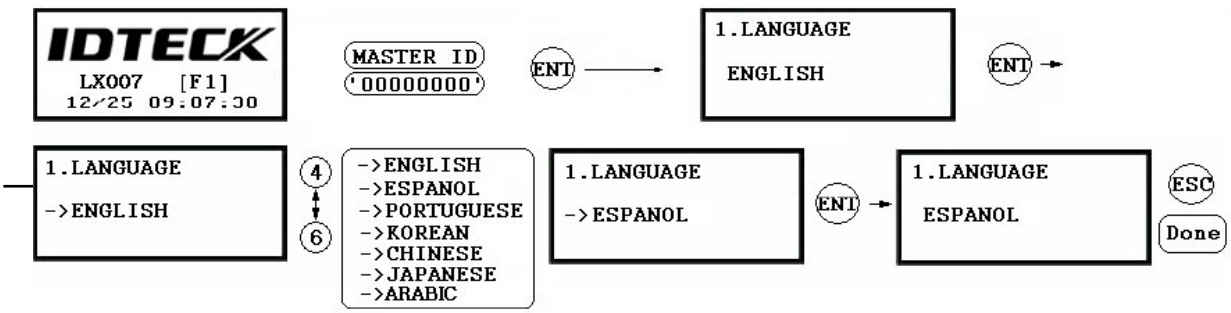
To set up the LX007 or to change the settings, you have to enter the **SETUP MENU** first. To do so, press **<0>** key eight (or ten) times and **<ENT>** key on the keypad. (The **Default Master ID** is '**00000000'.** For the **LX007SR**, it's '**0000000000'.**)

There are **10 SETUP MENUS** and you automatically enter **[F1 SETUP MENU]** first. You can move to other **SETUP MENUS** by pressing **<F1>** to **<F10>** keys. For example, if you want to go to **[F2 SETUP MENU]**, then press **<F2>** key. To enter **[F5 SETUP MENU]**, press **<F5>** key, and so on and on. There are several **SUBMENUS** inside each **SETUP MENU** and you can scroll up and down the **SUBMENU** by pressing **<4>** and **<6>** key. If you don't press any key within 60 seconds or if you press **<ESC>** key, the LX007 will exit the **SETUP MENU** and return to the normal operating mode. You can change the **Master ID** in the **[F7 SETUP MENU]**.



10.3 Language Setting

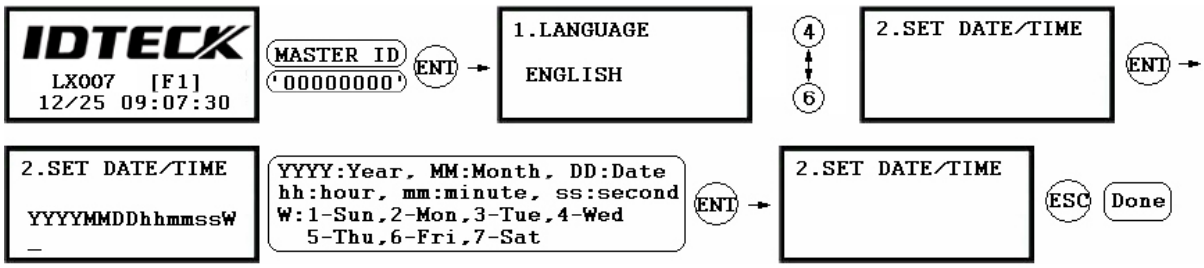
Select [**LANGUAGE**] in [**F1 SETUP MENU**] then press **<ENT>** key to select which language to use. The steps below show how to choose Spanish, for example.



3 Basic Languages (English, Espanol, Portuguese) + 1 Optional Language

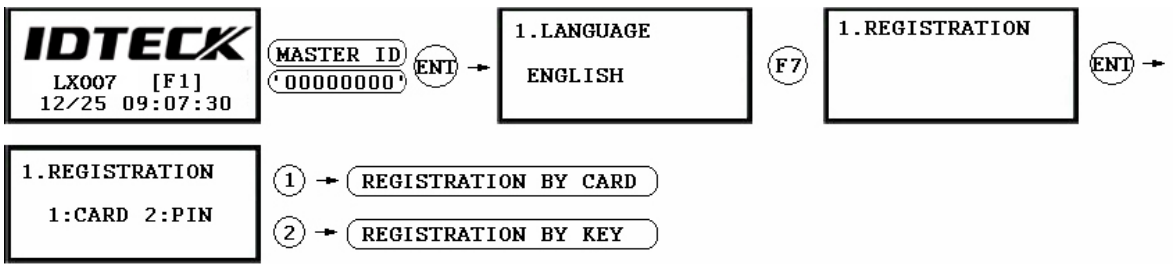
10.4 Date / Time Setting

Select **[SET DATE/TIME]** in **[F1 SETUP MENU]** and enter the total of 15 digits (*i.e.* Year / Month / Date / Hour / Minute / Second / Day) as shown below. The LCD will display the new Date and Time after the time setting is completed, but the year and day will not be displayed. The LX007 has a 24-hour system. Day codes are 1 for Sunday, 2 for Monday, 3 for Tuesday, 4 for Wednesday, 5 for Thursday, 6 for Friday and 7 for Saturday.

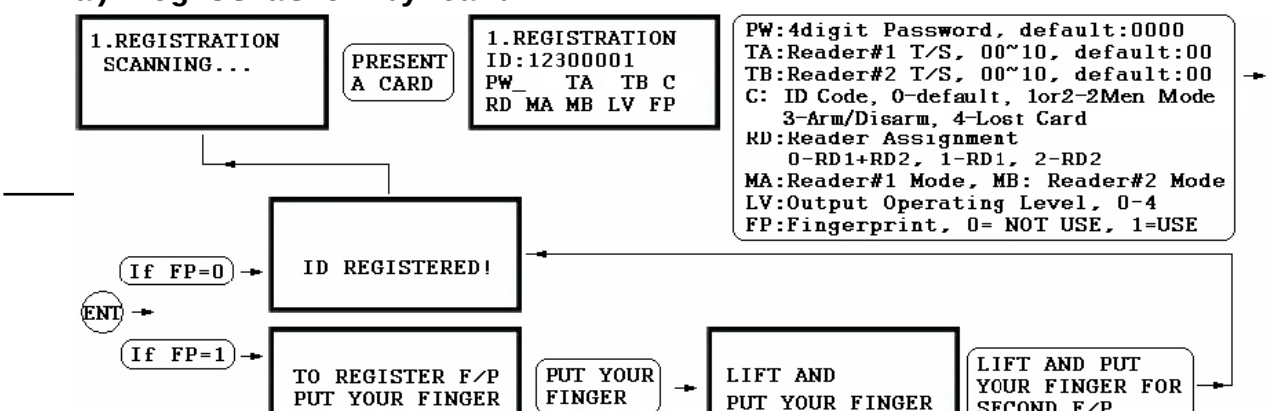


10.5 ID Registration

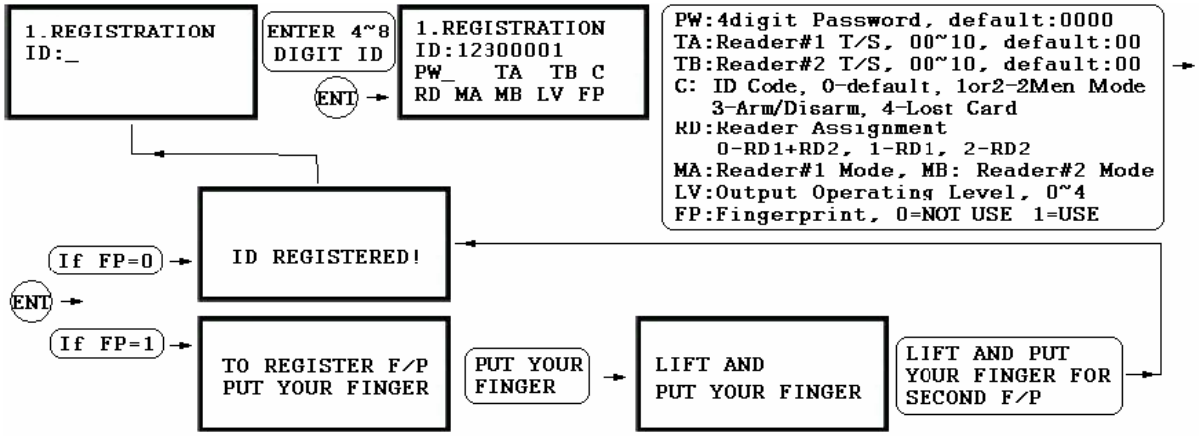
To register a User ID to the LX007, select **[F7 SETUP MENU]** -> **[REGISTRATION]**. You can choose to register an ID **a)** using a card or **b)** by entering a PIN.



a) Registration by Card



b) Registration Using Keypad



NOTE| In case you make a typing mistake during the registration process, you can press the F1 button to erase the errors.

1. **Scanning –** means the reader is waiting for an ID number to be entered. The number of the card will appear with a beep sound when you present a card.

2. **ID –** refers to a Personal Identification Number (PIN) that consists of 4-8 digits. Enter a 4-8 digit ID number (PIN) and press <**ENT**> key. (An ID number of the LX007SR consists of 4-10 digits.)

3. **PW –** stands for a password that is required for verification in the ID + Password operating mode.

4. **TA –** refers to the Time Schedule code (‘**00**’ - ‘**10**’) for the Reader#1 (*i.e.* the built-in reader). If you assign a Time Schedule in this field, the new cardholder can gain access only during the assigned Time Intervals. To set the Time Intervals for each Time Schedule code, refer to the instructions on the

Time Schedule Setup in the [**F4 SETUP MENU**]. If you wish to give the cardholder unlimited access time, enter the default Time Schedule code '00' for the value.

5. **TB –** refers to the Time Schedule code (‘**00**’ - ‘**10**’) for the Reader#2 (*i.e.* the exit reader). If you assign a Time Schedule in this field, the new cardholder can gain access only during the assigned Time Intervals. To set the Time Intervals for each Time Schedule code, refer to the instructions on the Time Schedule Setup in the [**F4 SETUP MENU**]. If you wish to give the cardholder unlimited access time, enter the default Time Schedule code '00' for the value.

6. **RD –** refers to the Reader Assignment code for the cardholder. Entering the code ‘0’ assigns both readers (Built-in Reader and Exit Reader) to grant access to the cardholder that is being registered, code ‘1’ only assigns Reader#1 (Built-in Reader) and code ‘2’ assigns Reader#2 (Exit Reader). If you enter ‘1’ in the RD field(Only Reader#1 assigned) and try to exit through Reader#2 (Exit Reader) then the LX007 generates an error message (“Access Door Error”) on the LCD display.

7. **C –** refers to the ID code. Code ‘0’ is default and codes ‘1’ and ‘2’ are codes are used for the TWO MEN MODE. Code ‘3’ is used for the ARM/DISARM function and code ‘4’ is assigned for lost cards.

8. **MA –** refers to the Operating Mode that the new cardholder will use on Reader#1 (*i.e.* the built-in reader). If you enter ‘1’ for MA, for example, this card holder will be able to gain access using his or her ID only.
   - **‘0’ –** Depend on System Operating Mode ([**F1 SETUP MENU**] > [**READER#1 MODE**])
   - **‘1’ –** ID Only Mode
   - **‘2’ –** ID + Fingerprint (Password)
   - **‘3’ –** ID + Password + Fingerprint

9. **MB –** refers to the Operating Mode that the new cardholder will use on Reader#2 (Exit Reader).
   - **‘0’ –** Depend on System Operating Mode ([**F1 SETUP**

MENU] > [**READER#2 MODE**])

- **'1' –** ID Only Mode
- **'2' –** ID + Password Mode

NOTE: You cannot apply the ID + Password Mode if Reader#2 does not have a keypad or does not use password verification.

10. **LV –** refers to the Output Operating Level for the new cardholder. Output operating time can be set for each user. To define an output operating time for each level, refer to the instructions on Output Setting in [**F6 SETUP MENU**].
    - **'0' or '1' –** Level #1
    - **'2' –** Level #2
    - **'3' –** Level #3
    - **'4' –** Level #4

11. **FP –** is the Fingerprint Usage Flag (1 digit). You can decide whether or not the user will use a fingerprint.
    - **'0' –** Not using a fingerprint
    - **'1' –** Using a fingerprint

c) How to Place Your Finger onto the Scanner

When you register or verify your fingerprint, please place your finger onto the scanner correctly as shown in the illustration below.

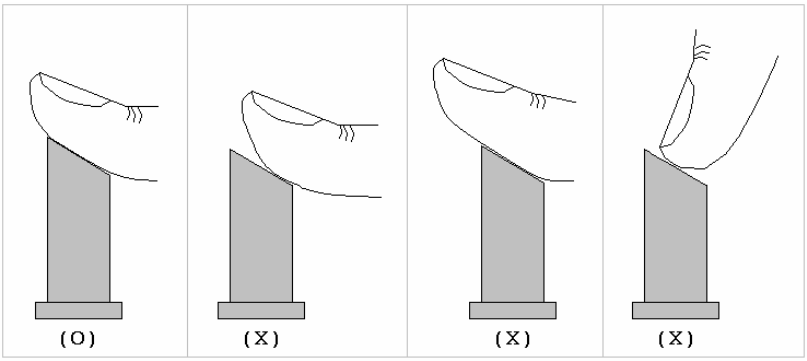


Figure: How to put your finger on the scanner

11. OPERATIONS

11.1 Normal Operation

Power on

When power is applied to the LX007, the Red LED is lit.

Reading of registered card

When a registered card (or a PIN) is read and his/her fingerprint is verified, the Door (Relay#1) will open for 3 seconds (Default) with the Green LED on.

Exit button

After the Exit Button is pressed, the Door (Relay#1) will stay open for 3 seconds with the Green LED on.

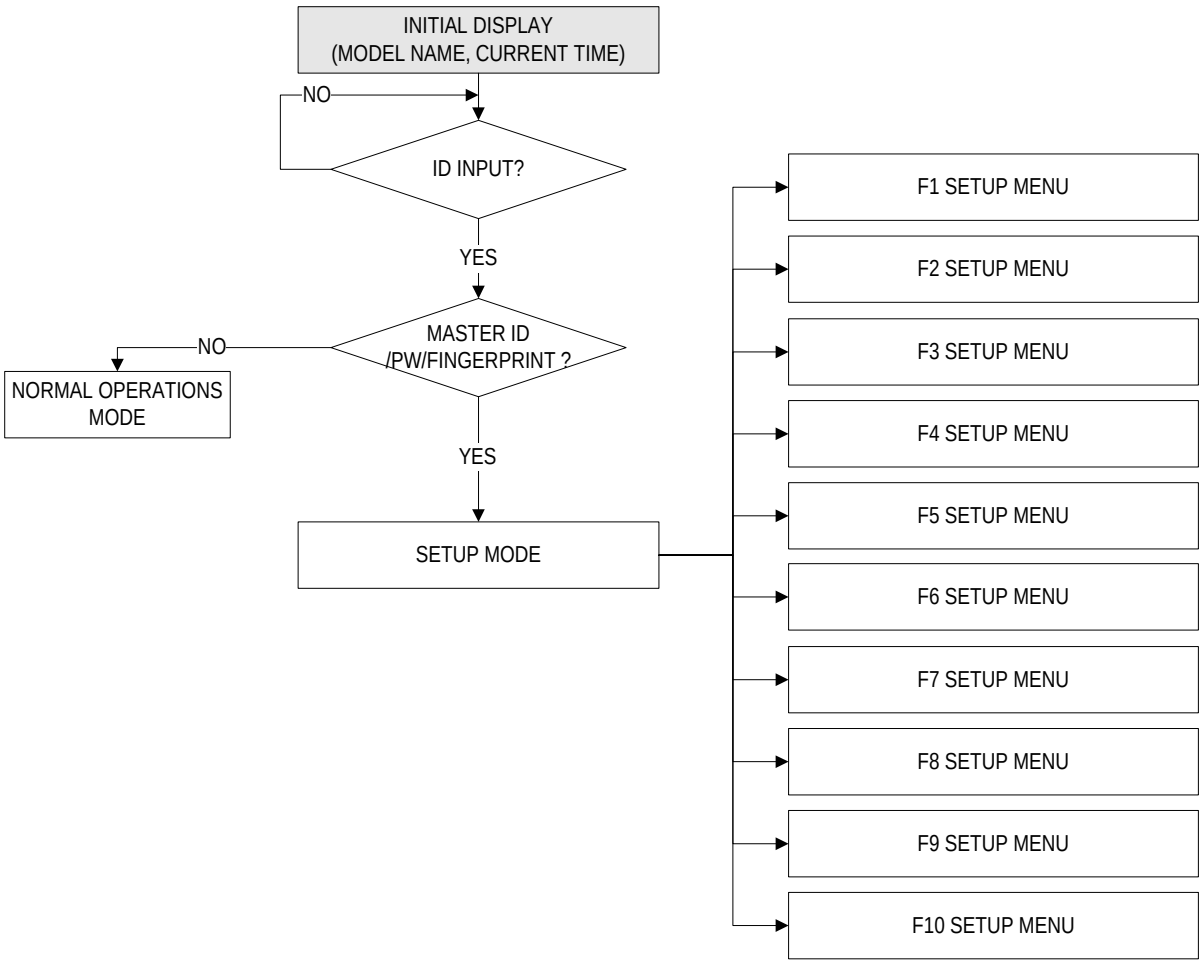
Alarms

If an unregistered card is read or a user's fingerprint fails to be verified, the access will be denied and an alarm (Relay#2) will be activated for 3 seconds with the Yellow LED on.

11.2 Default Setting

When you operate the system for the first time or after the system has been initialized, the factory setting values (*i.e.* the default settings) will be restored in the memory. You can change the settings for the desired application.

12. Setting Changes

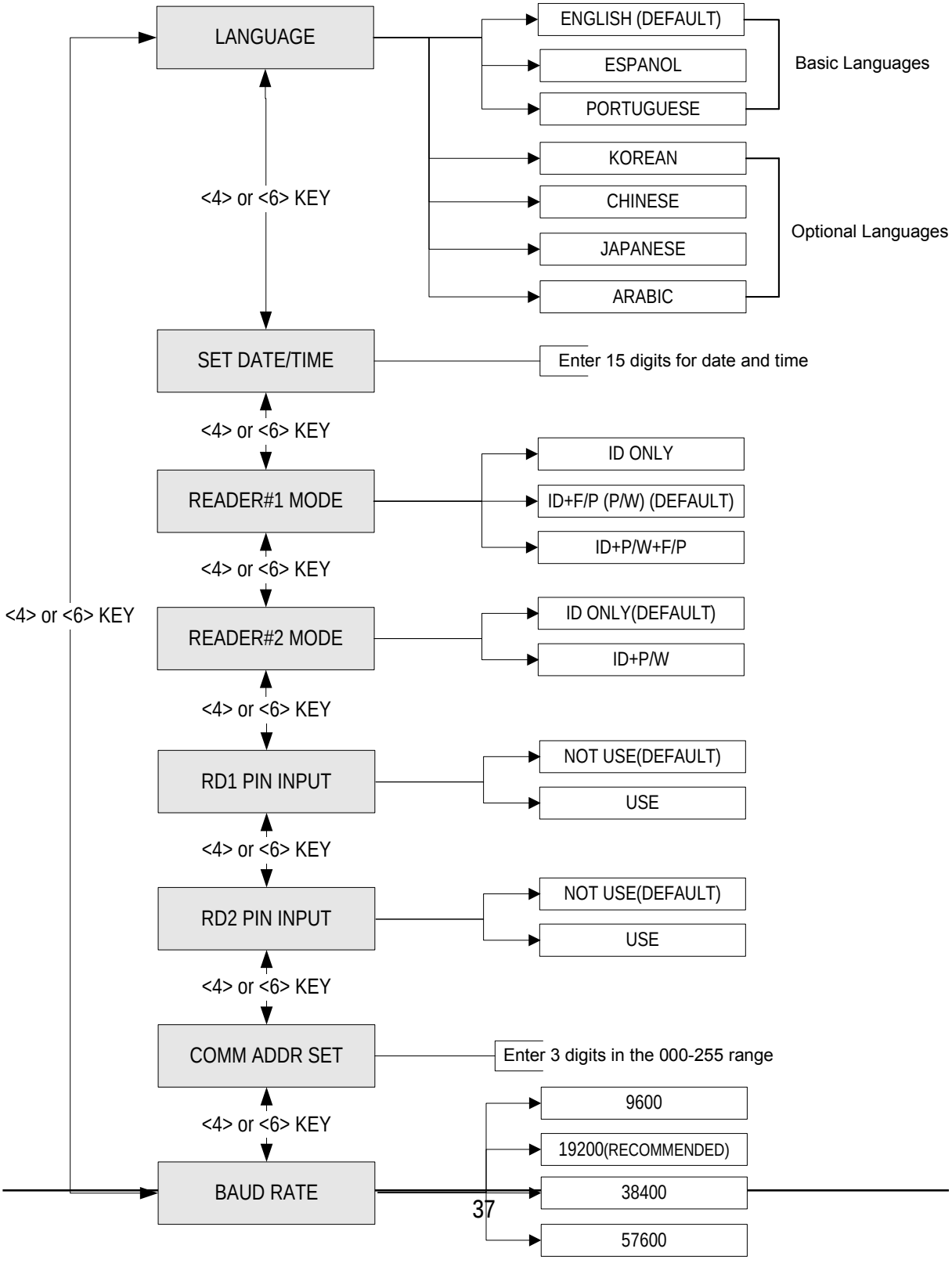


To set up the LX007 or to change the settings, you have to enter the **SETUP MENU** first. To do so, press **<0>** key eight (or ten) times and **<ENT>** key on the keypad. (The **Default Master ID** is '**00000000'.** For the **LX007SR**, it's '**0000000000'.**)

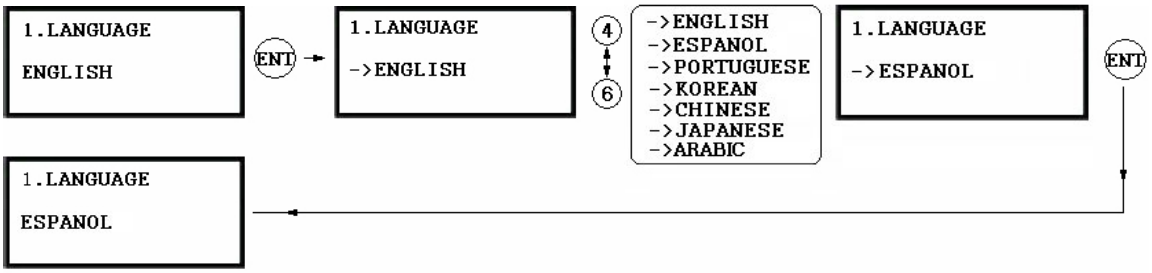
There are **10 SETUP MENUS** and you automatically enter **[F1 SETUP MENU]** first. You can move to other **SETUP MENUS** by pressing **<F1>** to **<F10>** keys. For example, if you want to go to **[F2 SETUP MENU]**, then press **<F2>** key. To enter **[F5 SETUP MENU]**, press **<F5>** key, and so on and on. There are several **SUBMENUS** inside each **SETUP MENU** and you can scroll up and down the **SUBMENU** by pressing **<4>** and **<6>** key. If you don't press any key within 60 seconds or if you press **<ESC>** key, the LX007 will exit the **SETUP MENU**

and return to the normal operating mode. You can change the **Master ID** in the **[F7 SETUP MENU]**.

12.1 F1 SETUP MENU



12.1.1 Language

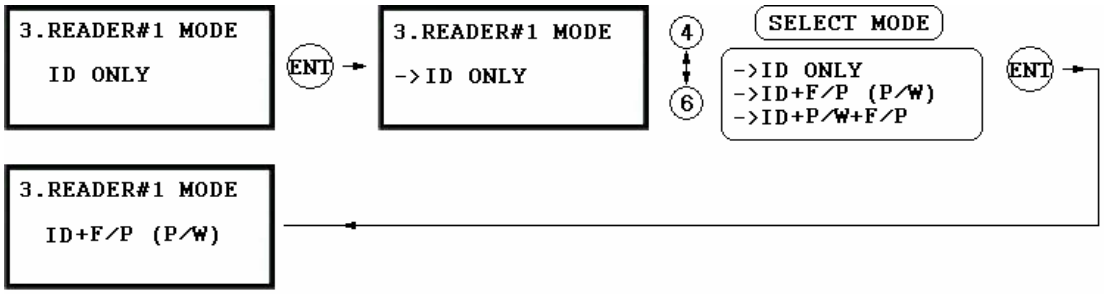


- ✓ The default language is English.
- ✓ Supported languages are English, Spanish and Portuguese.
- ✓ One optional language of choice(Korean, Chinese,

12.1.2 Date and Time Setting

- ✓ ***e.g.*** 200802101330152 = Feb. 10, 2008, 13:30:15, Monday

12.1.3 Reader #1 Mode



NOTE: READER#1 refers to the built-in proximity reader in the unit.

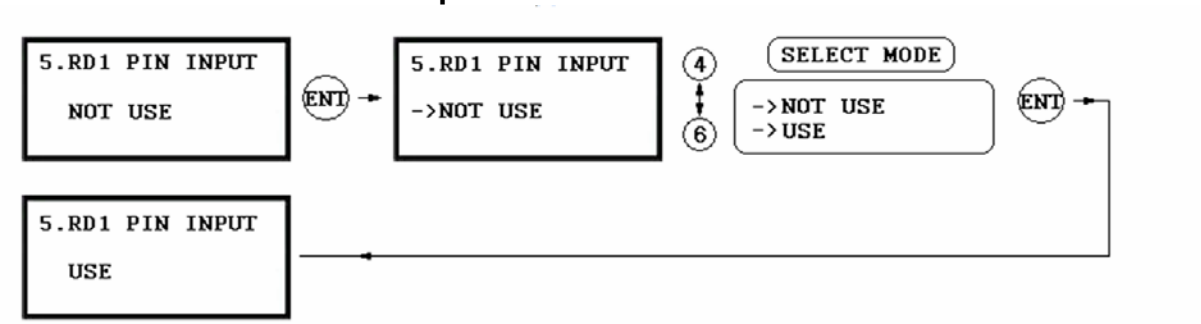
- ✓ **ID(PIN) ONLY:** In this mode, users can access the door by simply presenting their card or entering their ID number.
- ✓ **ID+F/P(P/W):** In this mode, users can access the door by presenting their card or entering their ID number and then verifying their identity by a fingerprint. For users who did not register their fingerprints, password verification is used instead of fingerprint

12.1.4 Reader #2 Mode

The READER#2 MODE setting can be configured in the same way as READER#1 MODE setting in the previous section.

NOTE: READER#2 refers to the Exit Reader connected to the LX007.
✓ **ID ONLY:** Select this mode if the Exit Reader is operating without using a password

12.1.5 Reader #1 PIN Input

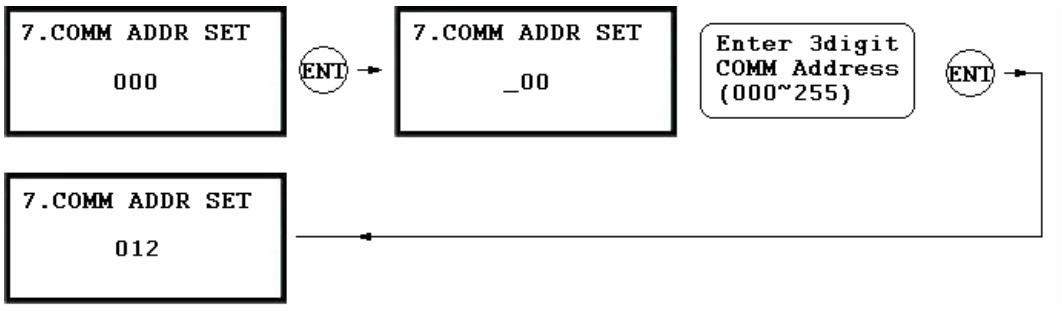


This setting allows you to decide whether to USE or NOT USE the keypad inputs for the Reader#1.The default setting is NOT USE the keypad input. If you want to

12.1.6 Reader #2 PIN Input

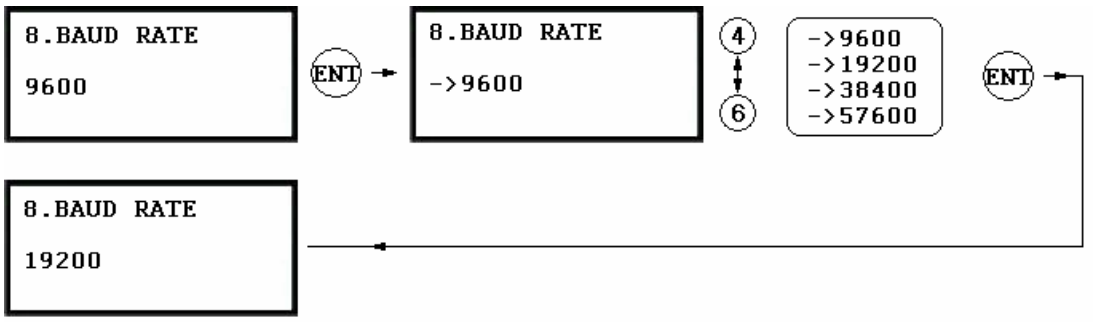
READER#2 PIN INPUT setting can be configured in the same way as READER#1 PIN INPUT setting in the previous entry.

12.1.7 Communication Address Setting



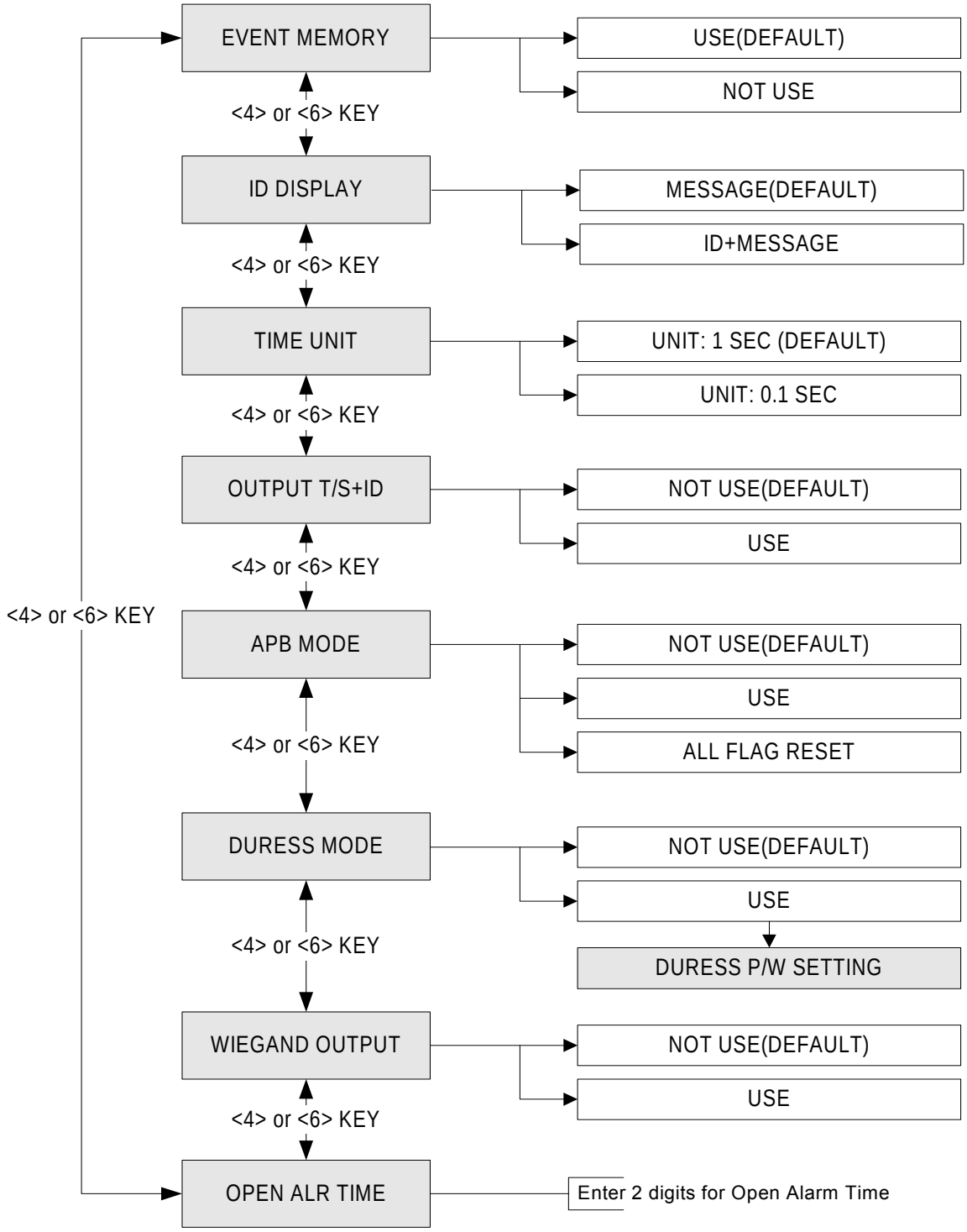
The default Communication Address is “000”.
Set a unique Communication Address for each unit in the

12.1.8 Baud Rate Setting

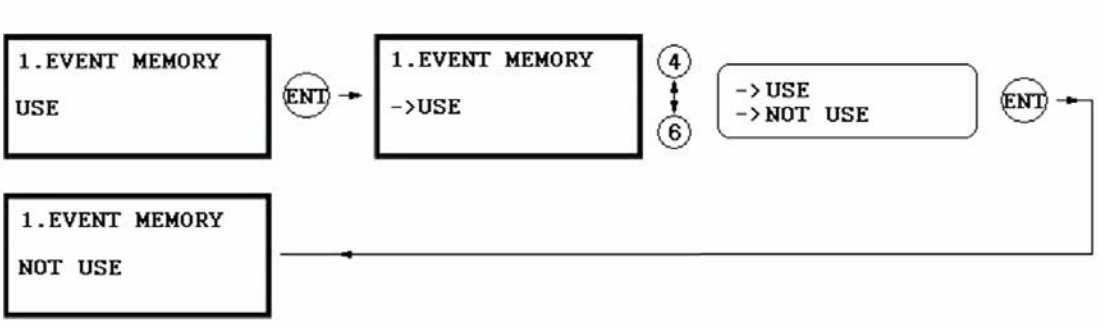


- ✓ The LX007 supports different Baud Rates of 9600, 19200, 38400 and 57600bps. The recommended Baud Rate is 19200bps. An incorrect Baud Rate setting will result in communication errors. Note that you should always set the same Baud Rate for the same communication network.
- ✓ If you have a communication problem, please check the followings;
  - Check the Communication Address for both the LX007 and the host PC in the Software.

12.2 F2 SETUP MENU

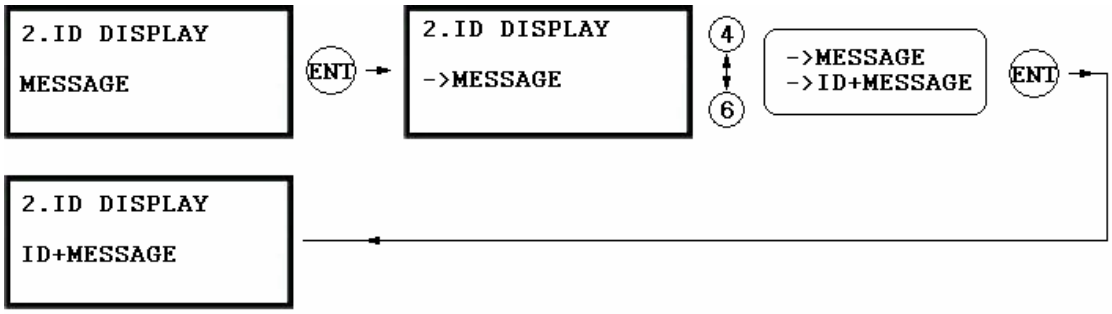


12.2.1 Event Memory



You can select what action to take after event memory is full. If you set the event memory to USE, the LX007 keeps all event transactions stored in the memory in case the event memory is full. On the other hand, if you select NOT USE, new events will be overwritten into the event buffer. If you use the LX007 in a stand alone

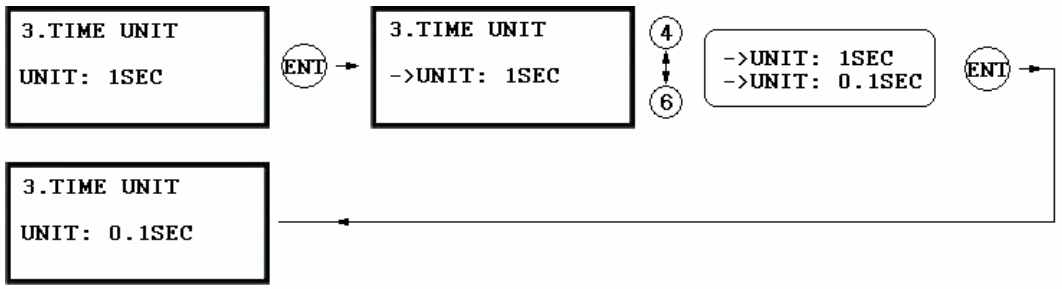
12.2.2 ID Display



If you want to display user ID numbers on the LCD, select ID+MESSAGE.

- ✓ **MESSAGE:** A text message and asterisks "********" will appear and the user ID number won't be displayed.
- ✓ **ID+MESSAGE:** The user ID number will be displayed

12.2.3 Time Unit Setting



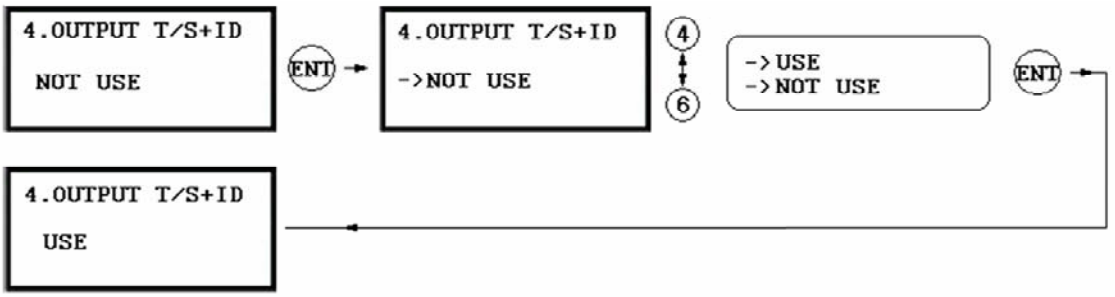
This setting allows you to define the unit of time.

- ✓ **1sec:** Output Time is calculated in the time unit of 1 second for the IN/OUT definition.
- ✓ **0.1sec:** Output Time is calculated in the time unit of 1/10 second (or 100ms) for the IN/OUT definition

e.g. If you want to activate the Door Relay (Relay #1, DR) for 3 seconds, appropriate setting values are as follows;

- The Time Unit should be set to 1 SEC.

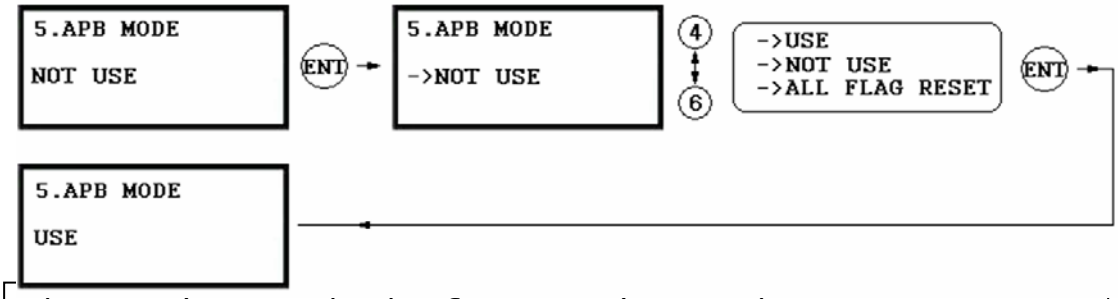
12.2.4 Output T/S + ID



This setting is related to the Output Time Schedule setting of **[F5 SETUP MENU]**. The Output Time Schedule setting can be used to generate outputs for a certain assigned period of time, for example to keep the door open during that time. By setting this Output T/S + ID setting to USE, you can delay the output (e.g. door opening) until the first access after the time schedule period begins. If there is no access during the assigned period, no output will be generated.

- ✓ **NOT USE:** Output is generated at the beginning of the assigned Time Interval.

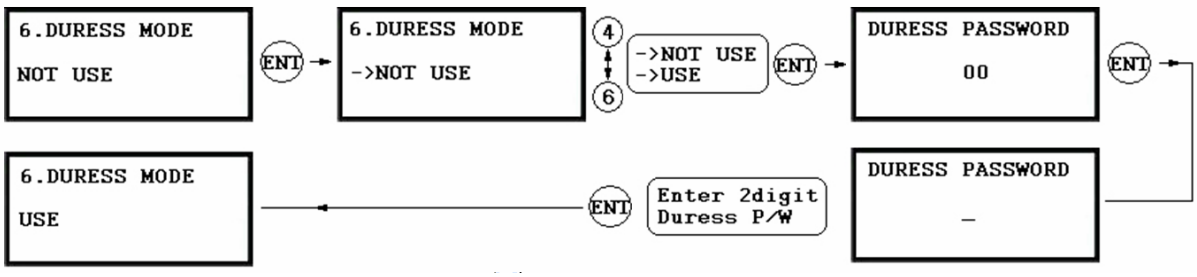
12.2.5 Anti-pass Back Mode



The Anti-pass back feature is used to prevent an identical user from entering or exiting the door more than twice in a row. This mode can be applied only when an Exit Reader is installed. DO NOT set this mode to USE if an Exit Button is installed instead of an Exit Reader.

- ✓ **NOT USE:** The Anti-pass back feature is disabled.
- ✓ **USE:** The Anti-pass back feature is enabled.
- ✓ **ALL FLAG RESET:** All Anti-pass back flags are reset.

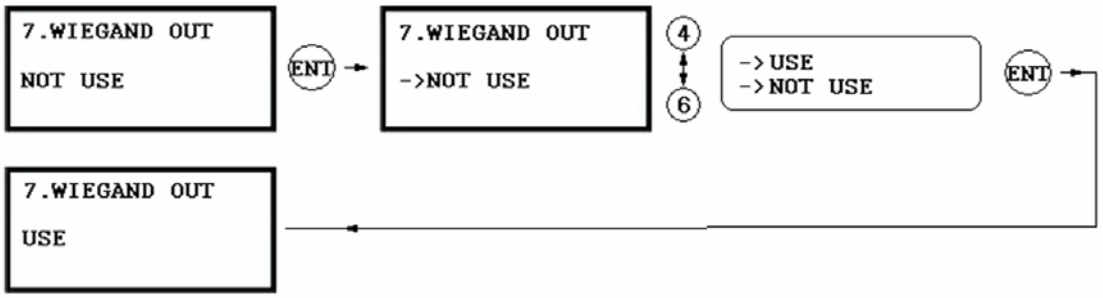
12.2.6 Duress Mode



You can set Duress Mode for Reader#1. The default setting is NOT USE. If you select USE, the LCD will display the default Duress Password '00'. If you want to change the Duress Password, press <ENT> key and enter a 2-digit Duress Password. If you do not want to change it, press the <ESC> key.

NOTE | In case of duress, enter the 2-digit Duress Password and press <ENT> key prior to presenting the card. The Duress Alarm will be

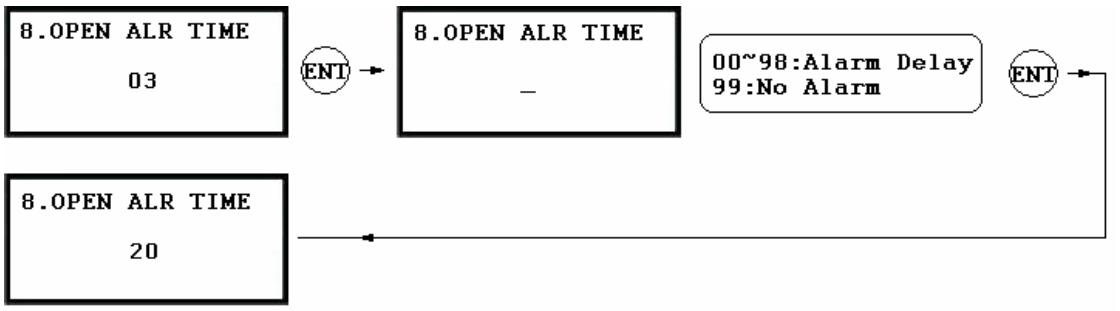
12.2.7 Wiegand Output



This feature allows you to use the LX007 as a reader (as opposed to as a controller). If this setting is set to USE, the LX007 sends 26bit Wiegand Output through two TTL output ports.
(The LX007SR sends out 34bit Wiegand output.)

- ✓ **NOT USE:** Normal TTL outputs will be activated.
- ✓ **USE:** 26bit Wiegand outputs will be generated through TTL1 and TTL2 ports. When a registered

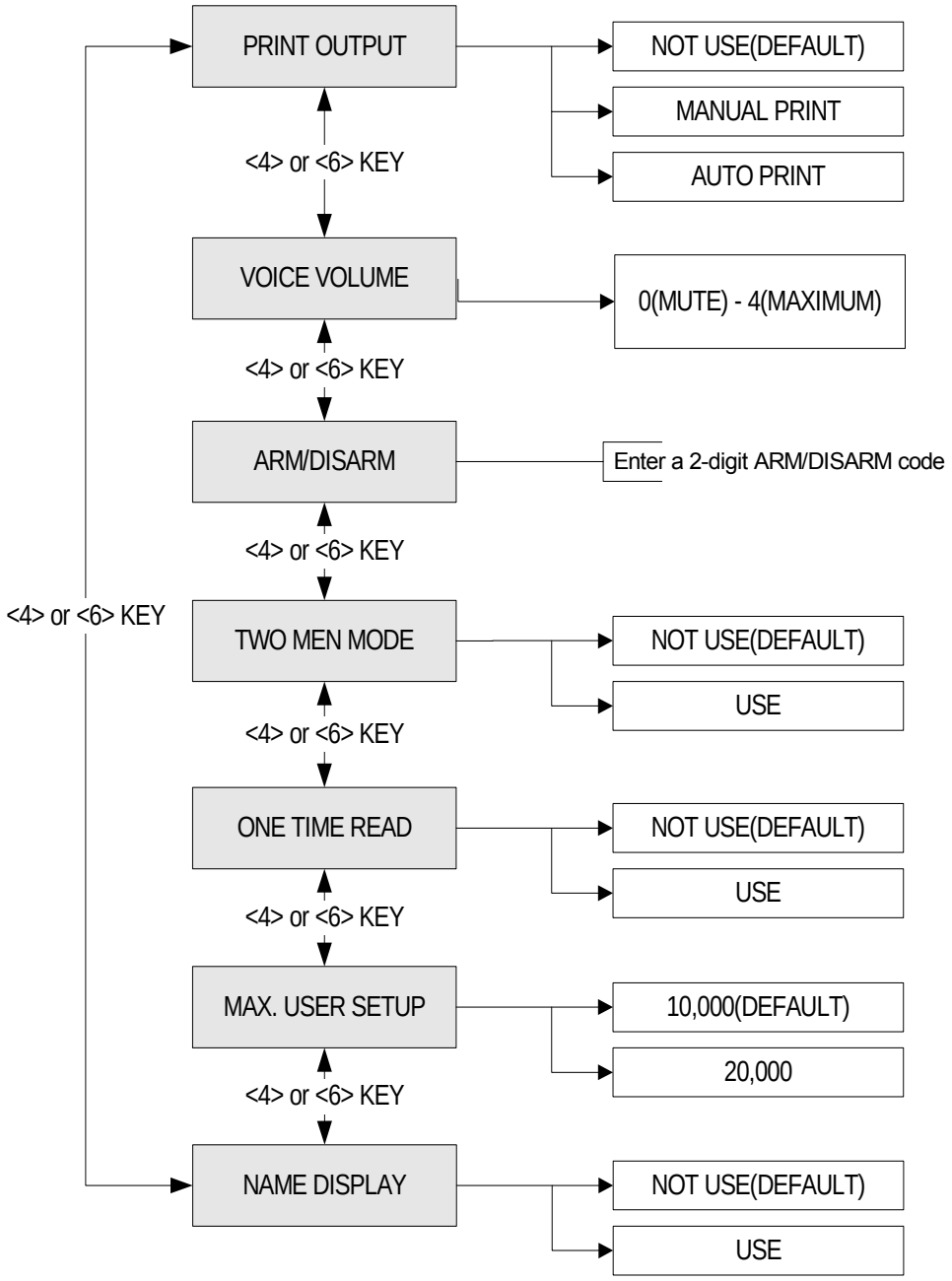
12.2.8 Door Open Alarm Time Setting



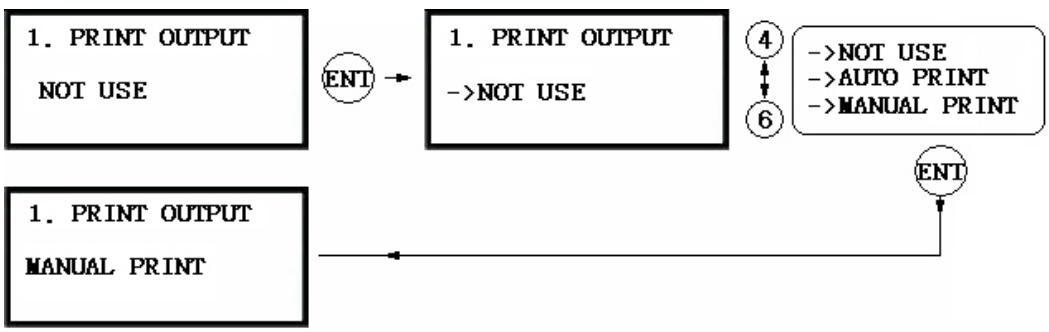
The Door Open Alarm Time is the delay between the point at which the Door Relay Time finishes and the point at which the Door Open Alarm starts ringing.

- ✓ **00:** The alarm will ring immediately past the Door Relay time if the door is left open.
- ✓ **01-98:** Delay (01-98 sec.) will be inserted before an alarm is triggered.
- ✓ **99:** No alarm.

12.3 F3 SETUP MENU



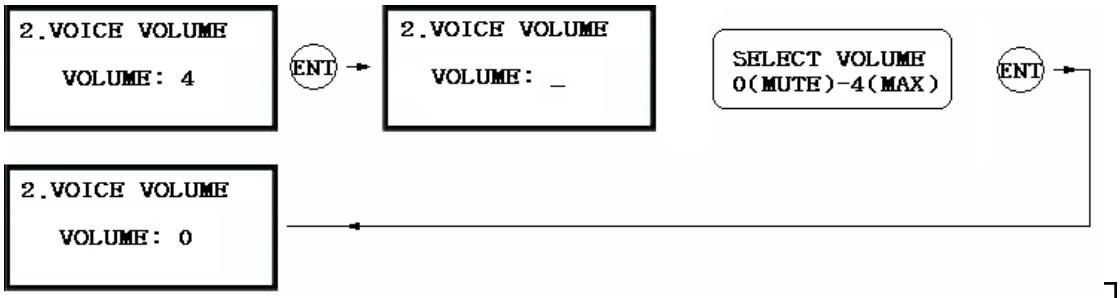
12.3.1 Print Output



~~If connected to a serial printer, the LX007 can send~~ the printer the details of new events including ID, data, time, function key, etc.

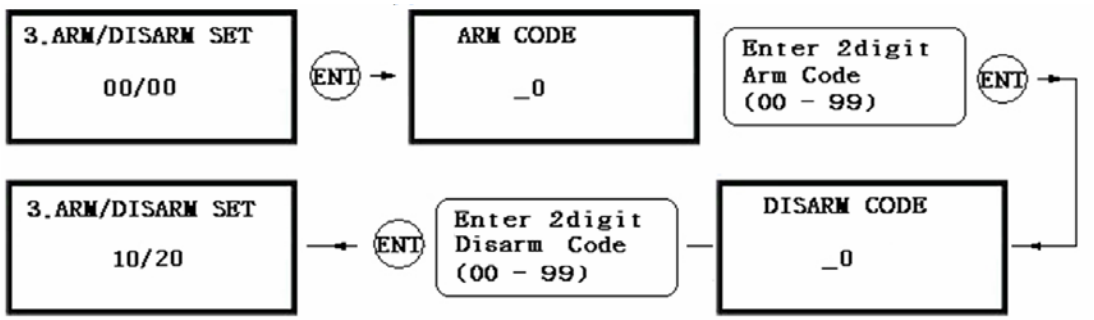
- ✓ **AUTO PRINT:** Print outputs are generated for every new event.
- ✓ **MANUAL PRINT:** By pressing '0' (no printing) or '1' (printing) key, you can manually select

12.3.2 Voice Volume



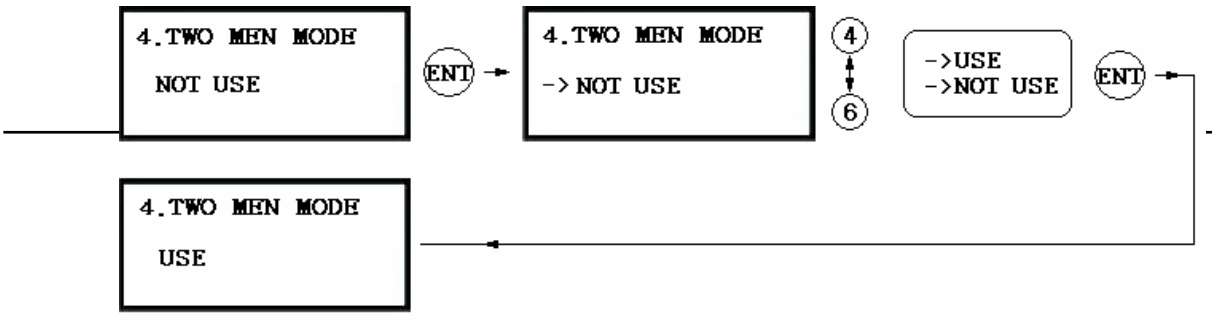
The LX007 tells you its status out loud. You can adjust the volume of the voice from 0 (mute) to 4 (maximum).
NOTE | For customized voice messages other than the default voice messages, please contact IDTECK.

12.3.3 Arm/Disarm



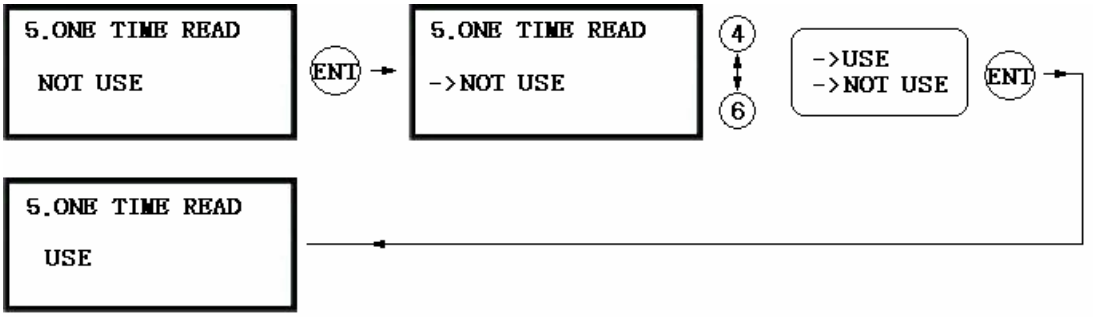
This setting allows you to set the Arm Code and the Disarm Code. After setting the Arm Code or Disarm Code, you can set the LX007 to the ARM mode by entering the ARM code and presenting an ARM/DISARM card (*i.e.* a card that was registered with Code 3). Once the LX007 toggles into ARM mode, all readers freeze and stop reading cards. To DISARM the LX007, enter the Disarm

12.3.4 Two Men Mode



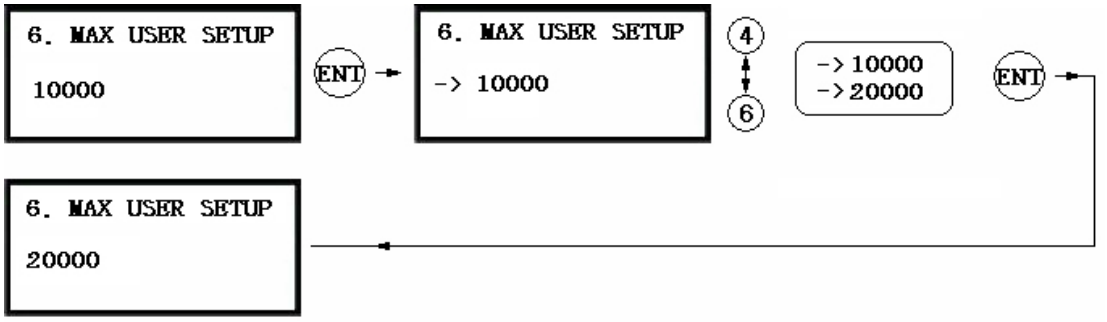
To apply this feature, cards designated for guides should be registered into the Guide Group(C:1) and visitor cards into the Visitor Group(C:2). If configured in the two-man mode, the LX007 won't grant access until one guide card and one visitor card are

12.3.5 One Time Read



If this option is set to USE, the same card can't be

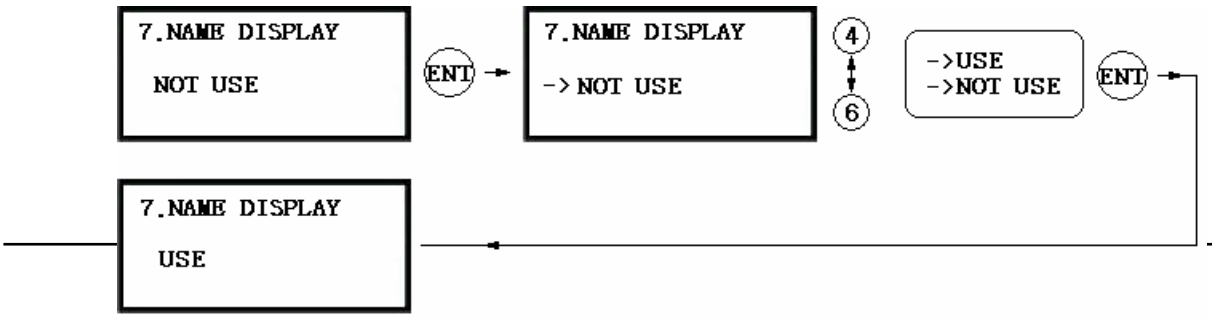
12.3.6 Max. User Setup



You can select the maximum number of user registrations; 10,000 or 20,000. If the maximum number of registrants is set to 20,000, the maximum number of event transactions becomes 10,000.

CAUTION: Before changing the maximum number of users,

12.3.7 Name Display

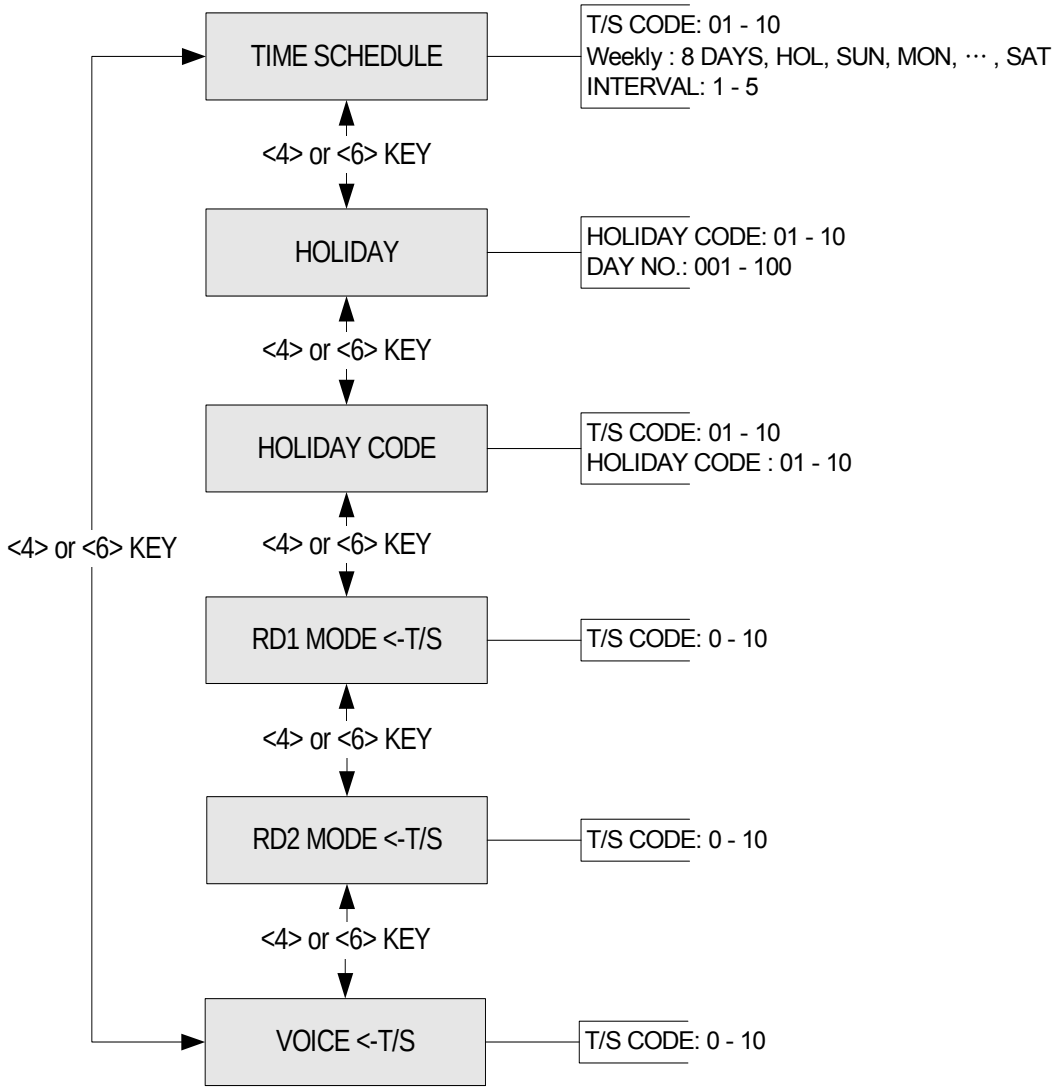


The Name Display option is used to determine whether the unit will display the name of the user who receives access.

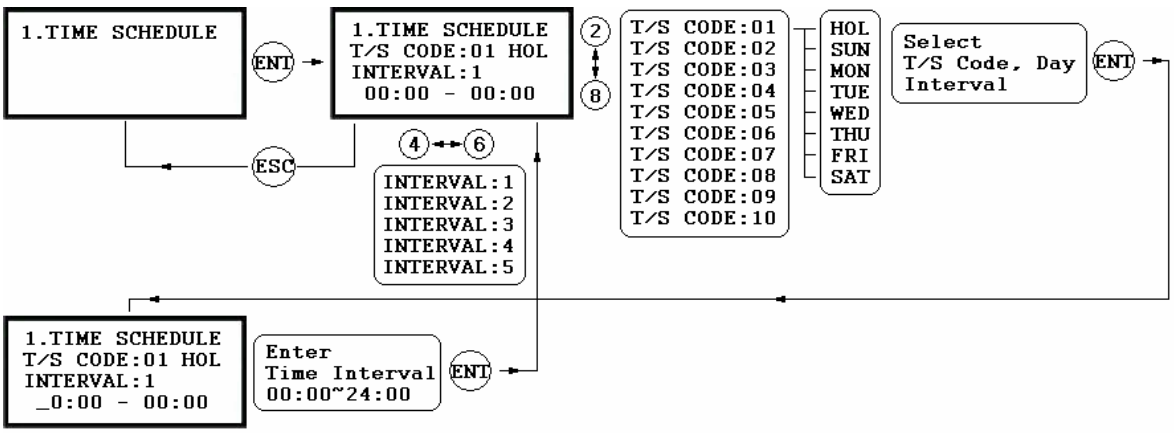
NOTE: User names can only be downloaded from the software. If you register a new user via the device SETUP MENU, the name of the user can't be entered and, therefore, won't be displayed when the user receives access.

CAUTION: If you set this option to USE, the maximum number of IDs that can be registered is limited to 10,000. Also, you can set this

12.4 F4 SETUP MENU

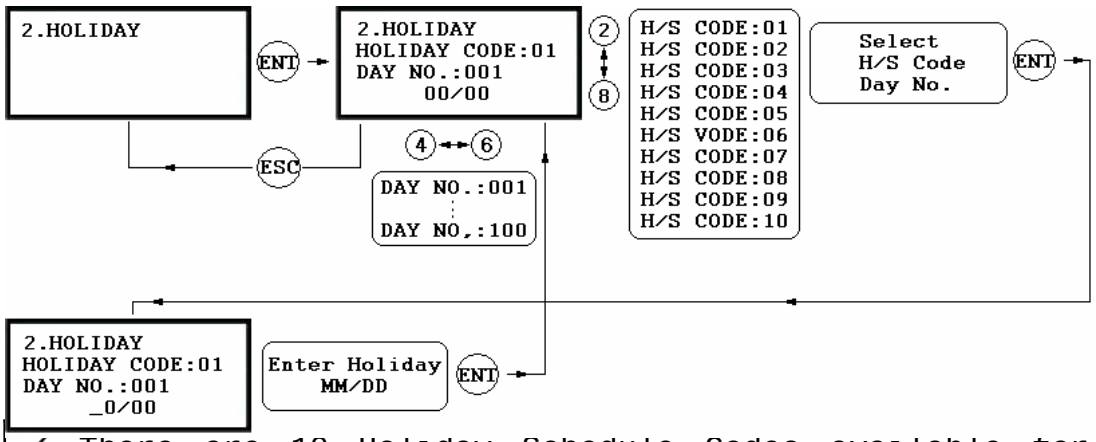


12.4.1 Time Schedule



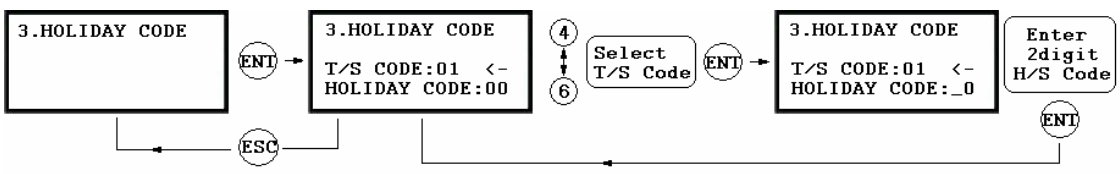
> ✓ There are 10 Time Schedule Codes available for users. Time Schedule Code "00" is the default setting that allows access to all users at any time. The user can program the Time Schedule Codes 01 to 10. Each Time Schedule Code has 8 programmable days (*i.e.* Sun, Mon, Tue, Wed, Thu, Fri, Sat and Holiday) and each day has 5 Time Intervals (*i.e.* Shift Time or Accessible Time Zone).

12.4.2 Holiday



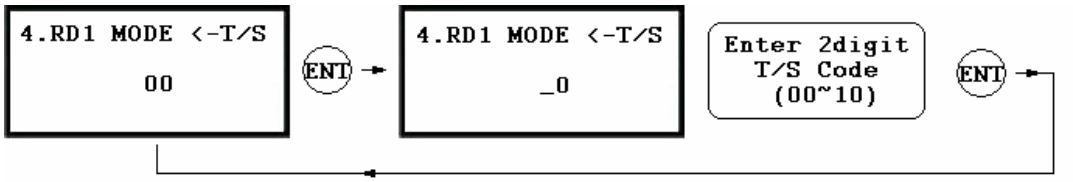
- ✓ There are 10 Holiday Schedule Codes available for users. Holiday Schedule Code “00” is the default code, which includes no Holidays in it. The user can program the Holiday Schedule Codes 01 to 10. Each Holiday Schedule Code can have up to 100 programmable holidays.
- ✓ The LCD will show current Holiday Code settings including H/S Code, Holiday number and Date. Use <2> or <8> key to scroll up and down from the Holiday Schedule Code 01 to 10 and use <4> or <6> key to select from Holiday number 001 to 100.

12.4.3 Holiday Code



- ✓ The Holiday Code setting allows you to link a Holiday Schedule to a Time Schedule. A Time Schedule has 5 Time Intervals for holidays and the Time Intervals are applied only to the dates of this Holiday Schedule. The default Holiday Schedule Code is '00' which means no holidays are applied to the Time Schedule.
- ✓ Use <4> or <6> key to scroll up and down from the T/S Code 01 to 10 and press <ENT> key. Then, enter a 2-

12.4.4 Reader#1 Mode Time Schedule

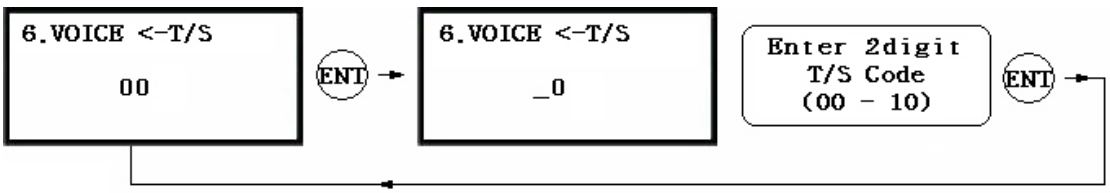


- ✓ There are 3 system operating modes including ID Only Mode, ID+F/P(PW) Mode and ID+PW+F/P Mode. You can select one of these system operating modes at [R1 MODE SETTING] from [F1 SETUP MENU]. However, you may apply ID Only Mode during a certain Time Interval. For example, suppose you want to access the door by only presenting a card from 09:00 to 17:00 and use the Fingerprint Verification method for the rest of the time. Then, you can do so by setting [R1 MODE SETTING] to ID+F/P Mode, which is for the system operating mode, and then program T/S Code 01 so that it can include a Time Interval between 09:00 and 17:00. Then, here, link the programmed Time Schedule Code 01 to the

12.4.5 Reader#2 Mode Time Schedule

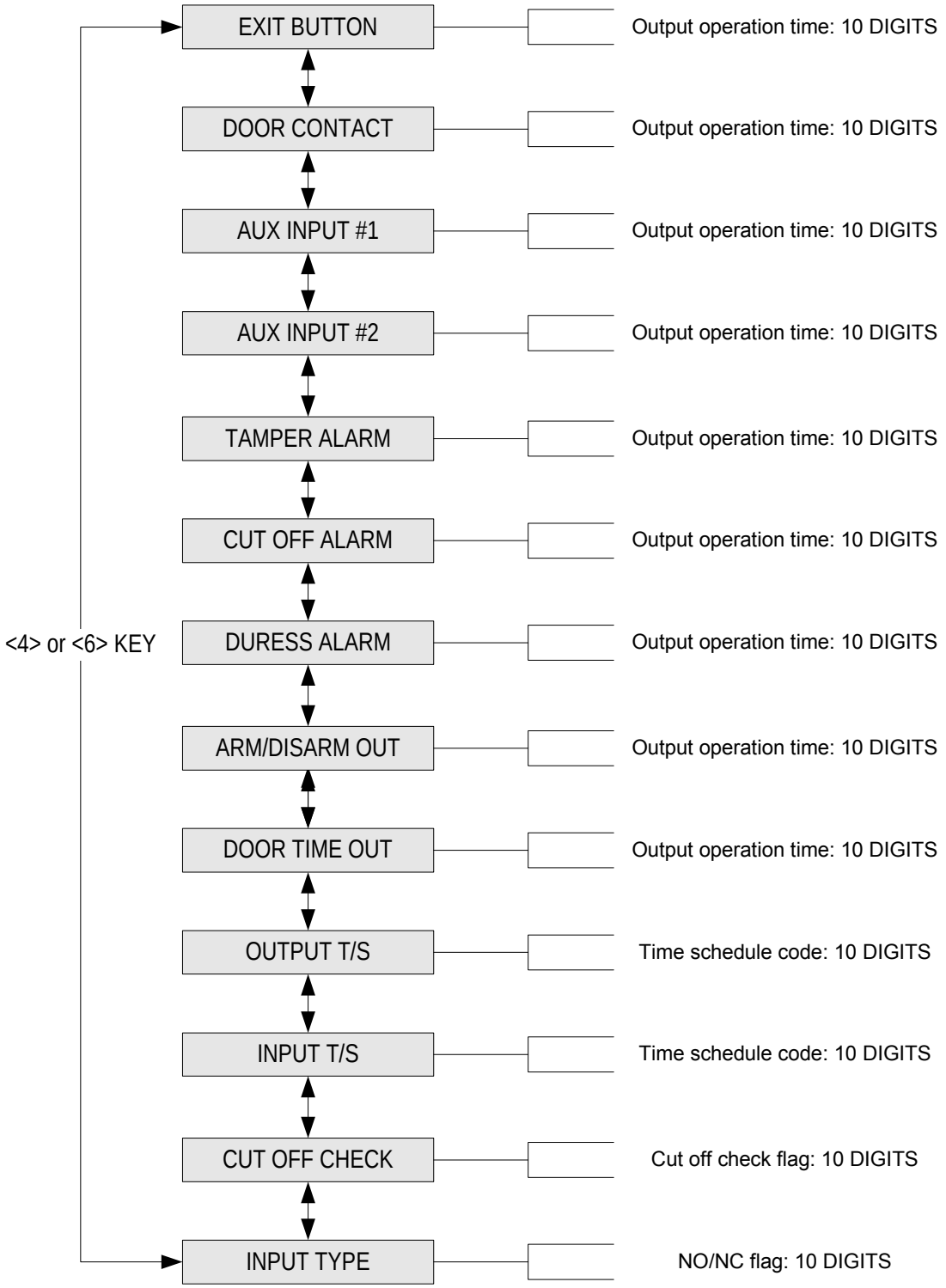
The READER#2 MODE TIME SCHEDULE setting can be configured in the same way as READER#1 MODE T/S setting, which is explained in the previous section.

12.4.6 Voice Time Schedule



- ✓ The Voice T/S feature allows you to apply time schedules to the voice message output. You can configure the unit to play voice messages in a certain time range and mute them at other times.
- ✓ To apply a time schedule code, enter the time schedule code you want. Within the time range assigned by the time schedule, voice messages will be played while at other times, they will not be played.

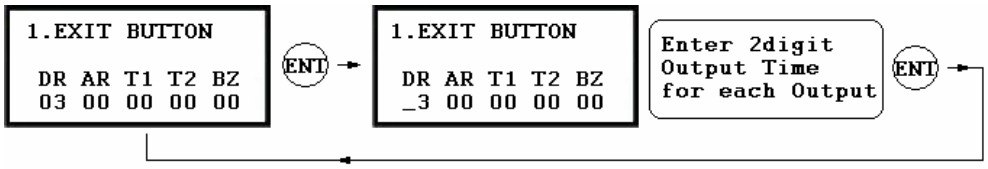
12.5 F5 SETUP MENU



Default Output Settings for Input Sources

OUTPUT	Door Relay (DR)	Alarm Relay (AR)	TTL#1 (T1)	TTL#2 (T2)	Buzzer (BZ)
[1] EXIT BUTTON	03	00	00	00	00
[2] DOOR CONTACT	00	99	00	00	00
[3] AUX Input #1	00	00	00	00	00
[4] AUX Input #2	00	00	00	00	00
[5] TAMPER ALARM	00	99	99	99	99
[6] CUT OFF ALARM	00	00	00	00	00
[7] DURESS ALARM	00	00	00	00	00
[8] ARM/DISARM OUT	00	00	00	00	00
[9] DOOR TIME OUT	00	99	00	00	00
[10] OUTPUT TIME SCHEDULE	00	00	00	00	00
INPUT	Exit Button (EX)	Door Contact Sensor (DC)	Aux Input #1 (I1)	Aux Input #2 (I2)	Tamper Switch (TP)
[11] INPUT TIME SCHEDULE	00	00	00	00	00
[12] CUT OFF CHECK	00	00	00	00	00
[13] INPUT TYPE	00	00	00	00	00

12.5.1 Exit Button Output Setting



- ✓ You can program the Output Activation Time, the length of time for which the output is activated after the EXIT button is pressed.
- ✓ Let's say, we put '03' for one of the fields, If the unit of time is set to '1 sec', then the activation time will be 3 seconds. If the unit of time is set to '0.1 sec', then the activation time will be 0.3 seconds (or 300 ms.)
- ✓ You can set the time somewhere between 00 and 98 seconds (or between 0.0 and 9.8 seconds if the Time Unit is set to 0.1 sec.) If you enter "99", the corresponding output will be activated forever until you reset the output.

12.5.2 Door Contact Output Setting

12.5.3 Aux Input#1 Output Setting

12.5.4 Aux Input#2 Output Setting

12.5.5 Tamper Alarm Output Setting

12.5.6 Cut Off Alarm Output Setting

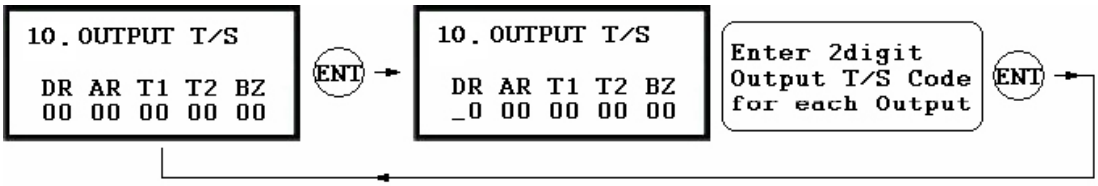
12.5.7 Duress Alarm Output Setting

12.5.8 Arm/Disarm Output Setting

12.5.9 Door Time Output Setting

The rest of output activation time settings above can be configured in the same way as the Exit Button Output Setting in the section 12.5.1, which means you can refer to that section to get some idea as to how to do the configuration.

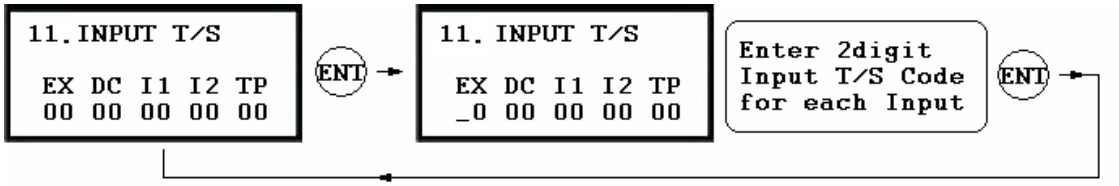
12.5.10 Output Time Schedule Setting



- ✓ You can assign a Time Schedule Code to each output. The default Time Schedule Code for every output is “00”, which means no Time Schedule is applied to them.
- ✓ Changing these settings can be very useful when you want to leave the door open during a certain time period. Press <ENT> key enter the setting mode and enter a 2-digit Time Schedule Code for each output.

    - **DR:** Door Relay Output T/S Code
    - **AR:** Alarm Relay Output T/S Code
    - **T1:** TTL#1 Output T/S Code

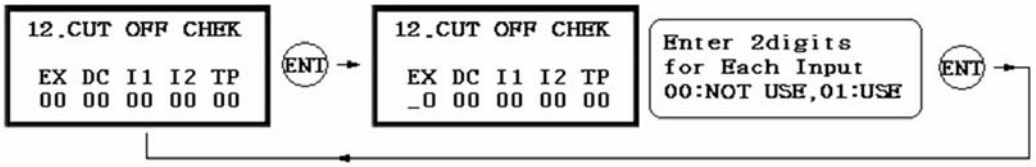
12.5.11 Input Time Schedule Setting



- ✓ You can assign a Time Schedule Code to each input to activate the input only during that period. The default Time Schedule Code for every input is “00”, which means no Time Schedule is applied to them. Changing these settings can be very useful when you want to activate PIR sensor input during a certain period of time.
- ✓ Press <ENT> key to enter this setting mode, then enter a 2-digit Time Schedule Code for each input.

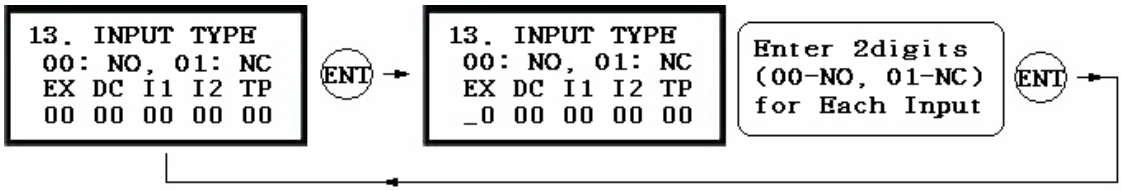
  - **EX:** EXIT Button Input T/S Code
  - **DC:** Door Contact Sensor Input T/S Code

12.5.12 Cut Off Check Setting



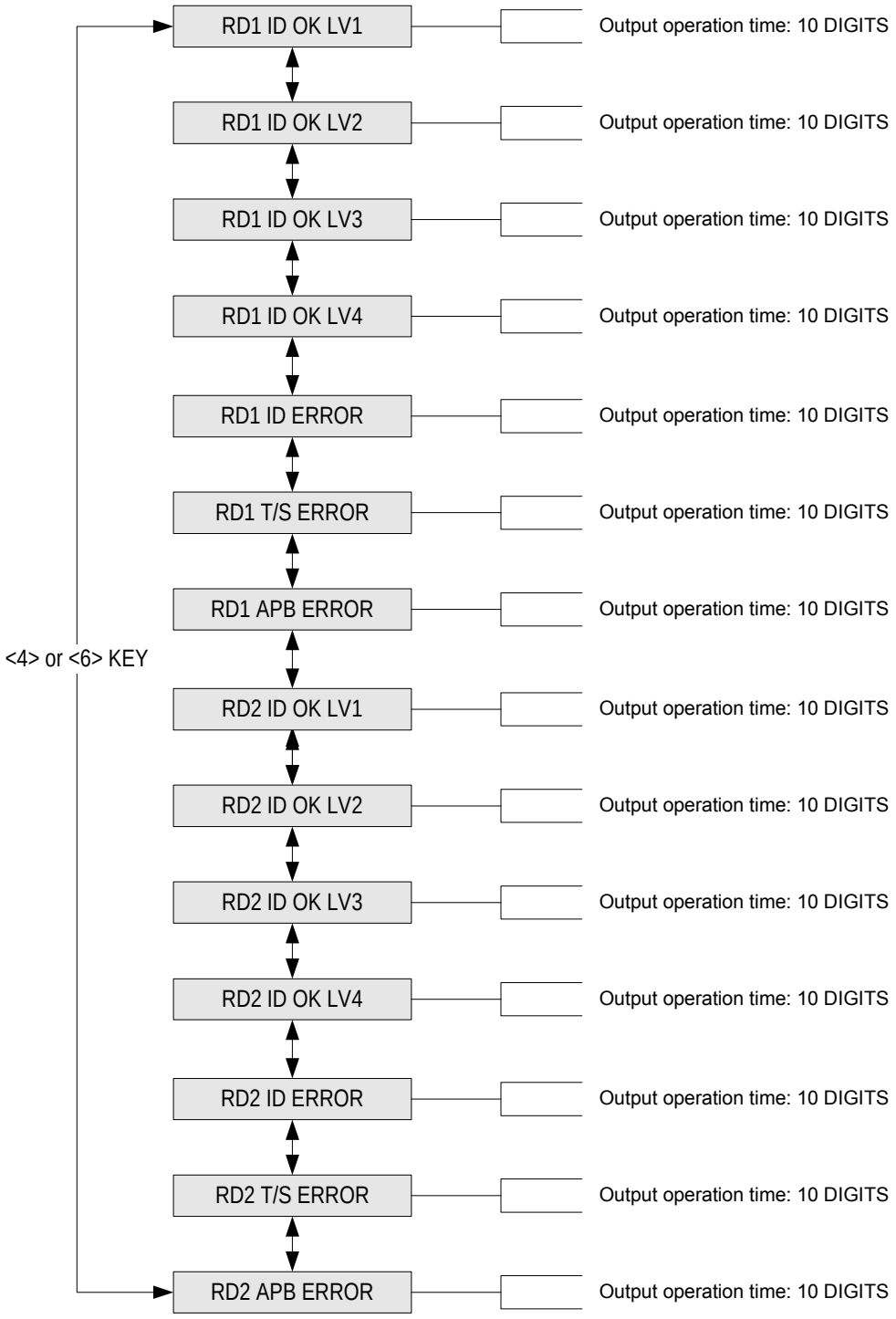
You can choose whether or not to check the connection cutoff of each input port. ‘00’ means not using this feature and ‘01’ means using it.
CAUTION: Before applying this feature, a 2.2K resistor

12.5.13 Input Type Setting



You can program each input for either NO(Normally Open) or NC(Normally Close) operation. ‘00’ means NO while

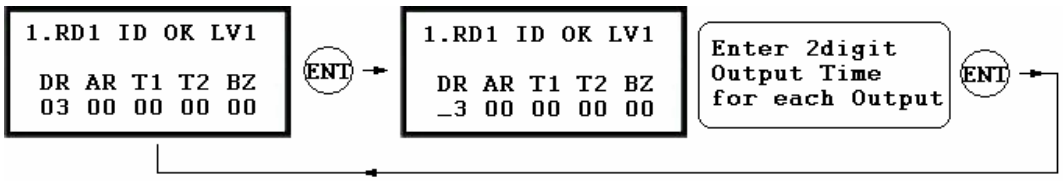
12.6 F6 SETUP MENU



Default Output Setting for Different Inputs

OUTPUT	Door Relay (DR)	Alarm Relay (AR)	TTL#1 (T1)	TTL#2 (T2)	Buzzer (BZ)
[1] Reader#1 ID OK LV1	**03**	00	00	00	00
[2] Reader#1 ID OK LV2	**05**	00	00	00	00
[3] Reader#1 ID OK LV3	**05**	00	00	00	00
[4] Reader#1 ID OK LV4	**05**	00	00	00	00
[5] Reader#1 ID Error	00	**03**	00	00	00
[6] Reader#1 T/S Error	00	**03**	00	00	00
[7] Reader#1 APB Error	00	**03**	00	00	00
[8] Reader#2 ID OK LV1	**03**	00	00	00	00
[9] Reader#2 ID OK LV2	**05**	00	00	00	00
[10] Reader#2 ID OK LV3	**05**	00	00	00	00
[11] Reader#2 ID OK LV4	**05**	00	00	00	00
[12] Reader#2 ID Error	00	**03**	00	00	00
[13] Reader#2 T/S Error	00	**03**	00	00	00
[14] Reader#2 APB Error	00	**03**	00	00	00

12.6.1 Output Setting for Reader#1 ID OK Level 1



- ✓ You can program the Output Activation Time, the length of time during which the output is activated after the EXIT button is pressed. The actual Output Activation Time equals either V seconds, provided that the Time Unit is set to 1 second, or V/10 seconds, provided that the Time Unit is set to 0.1 second. (V=Activation Time Value assigned for each output.)
- ✓ You can set the time somewhere between 00 and 98 seconds (between 0.0 and 9.8 seconds if the Time Unit is set to 0.1 sec.) If you enter “99”, the corresponding output will be activated forever until you reset the Output.

Output Time setting from 12.6.2 to 12.6.14 can be configured in the same way as 12.6.1 RD1 ID OK Level 1 Output setting.

12.6.2 Output Setting for Reader#1 ID OK Level 2

This output time is applied for the users registered with Level#2 output.

12.6.3 Output Setting for Reader#1 ID OK Level 3

This output time is applied for the users registered with Level#3 output.

12.6.4 Output Setting for Reader#1 ID OK Level 4

This output time is applied for the users registered with Level#4 output.

12.6.5 Output Setting for Reader#1 ID Error

This output time is applied when a user that is not registered in Reader #1 attempts access.

12.6.6 Output Setting for Reader#1 T/S Error

This output time is applied when a user attempts access before or after the time assigned by the applied time schedule.

12.6.7 Output Setting for Reader#1 APB Error

This Output Time is applied when a user who attempts access has violated the one-entry-one-exit rule of Anti-pass-back.

12.6.8 Output Setting for Reader#2 ID OK Level 1

This Output Time is applied for the users registered

with Level#1 output.

12.6.9 Output Setting for Reader#2 ID OK Level 2

This Output Time is applied for the users registered with Level#2 output.

12.6.10 Output Setting for Reader#2 ID OK Level 3

This Output Time is applied for the users registered with Level#3 output.

12.6.11 Output Setting for Reader#2 ID OK Level 4

This Output Time is applied for the users registered with Level#4 output.

12.6.12 Output Setting for Reader#2 ID Error

This output time is applied when a user that is not registered in Reader #2 attempts access.

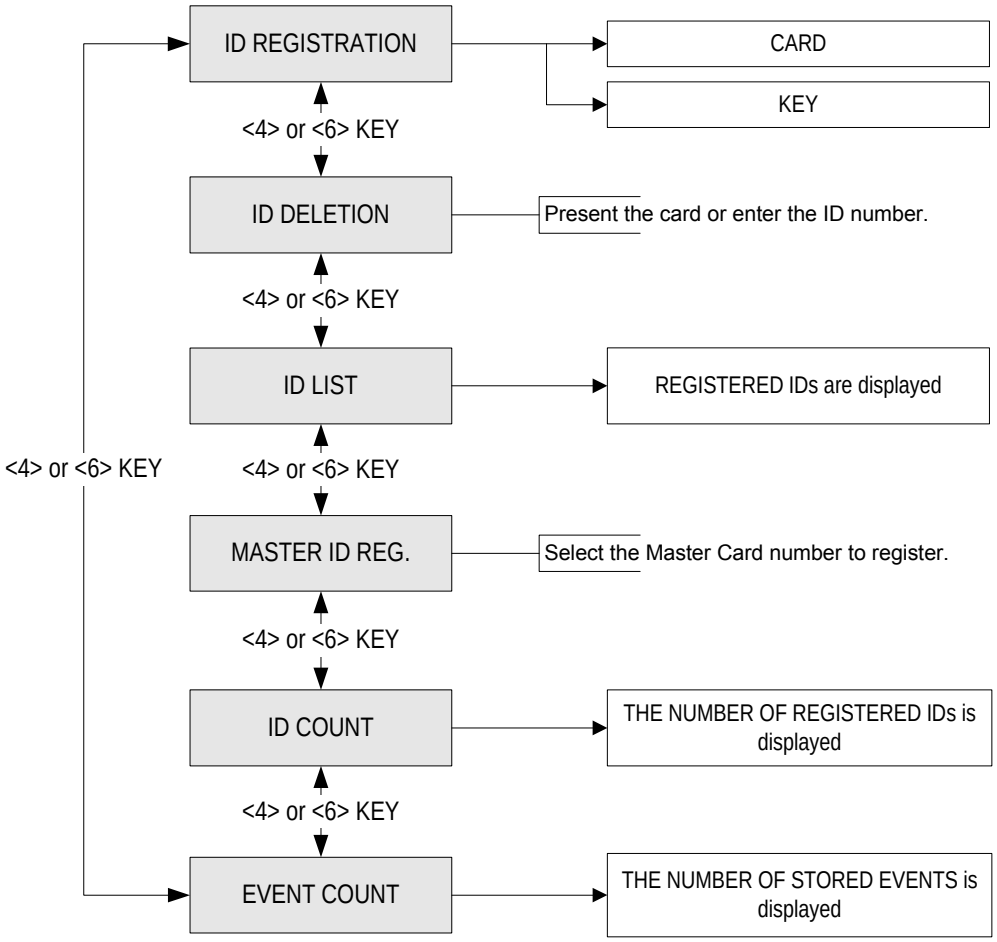
12.6.13 Output Setting for Reader#2 T/S Error

This output time is applied when a user attempts access before or after the time assigned by the applied time schedule.

12.6.14 Output Setting for Reader#2 APB Error

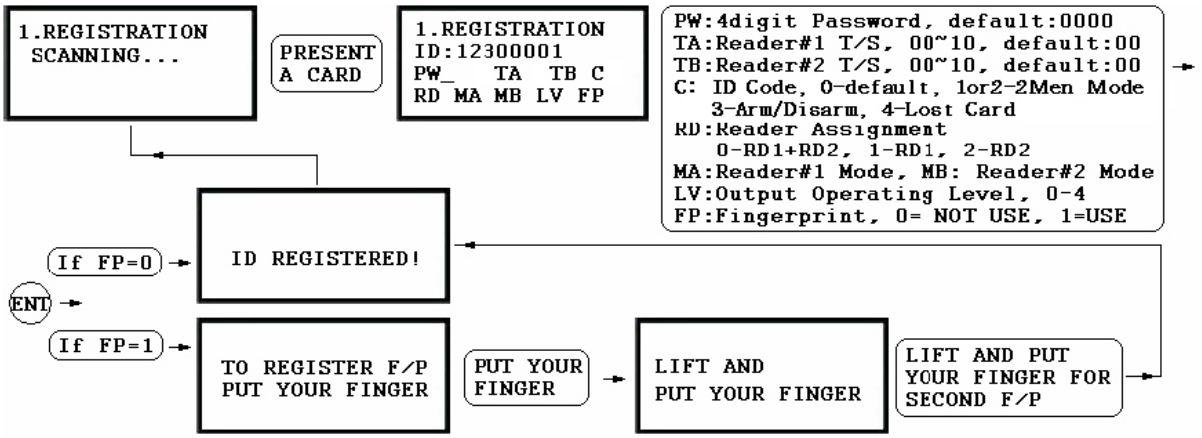
This Output Time is applied when a user who attempts access has violated the one-entry-one-exit rule of Anti-pass back.

12.7 F7 SETUP MENU

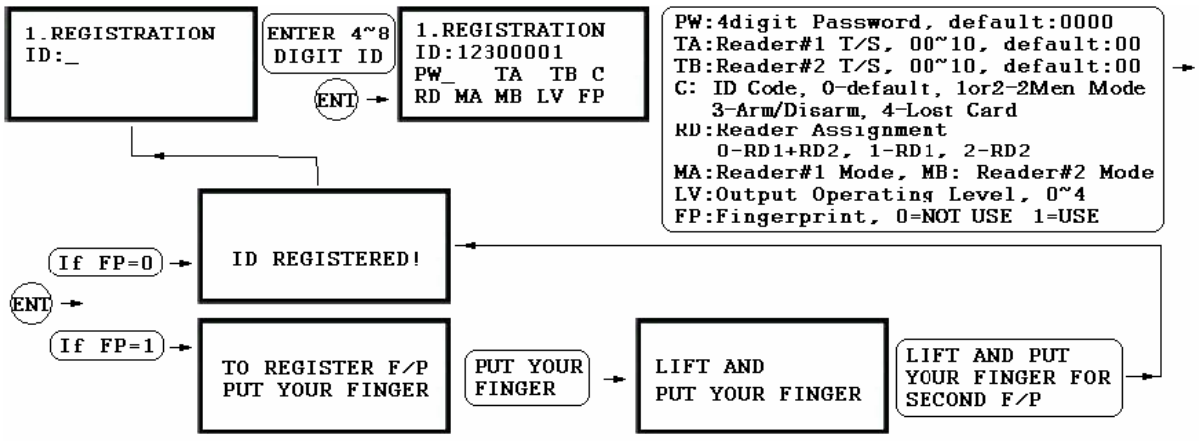


12.7.1 ID Registration

a) Registration by Card



b) Registration Using Keypad



NOTE| In case you make a typing mistake during the registration process, you can press the F1 button to erase the errors.

1. **Scanning –** means the reader is waiting for an ID number to be entered. The number of the card will appear with a beep sound when you present a card.

2. **ID –** refers to a Personal Identification Number (PIN) that consists of 4-8 digits. Enter a 4-8 digit ID number (PIN) and press <**ENT**> key. (An ID number of the LX007SR consists of 4-10 digits.)

3. **PW –** stands for a password that is required for verification in the ID + Password operating mode.

4. **TA –** refers to the Time Schedule code (‘**00**’ - ‘**10**’) for the Reader#1 (*i.e.* the built-in reader). If you assign a Time Schedule in this field, the new cardholder can gain access only during the assigned Time Intervals. To set the Time Intervals for each Time Schedule code, refer to the instructions on the Time Schedule Setup in the [**F4 SETUP MENU**]. If you wish to give the cardholder unlimited access time, enter the default Time Schedule code '00' for the value.

5. **TB –** refers to the Time Schedule code (‘**00**’ - ‘**10**’) for the Reader#2 (*i.e.* the exit reader). If you assign

a Time Schedule in this field, the new cardholder can gain access only during the assigned Time Intervals. To set the Time Intervals for each Time Schedule code, refer to the instructions on the Time Schedule Setup in the [**F4 SETUP MENU**]. If you wish to give the cardholder unlimited access time, enter the default Time Schedule code '00' for the value.

6. **RD –** refers to the Reader Assignment code for the cardholder. Entering the code ‘0’ assigns both readers (Built-in Reader and Exit Reader) to grant access to the cardholder that is being registered, code ‘1’ only assigns Reader#1 (Built-in Reader) and code ‘2’ assigns Reader#2 (Exit Reader). If you enter ‘1’ in the RD field(Only Reader#1 assigned) and try to exit through Reader#2 (Exit Reader) then the LX007 generates an error message (“Access Door Error”) on the LCD display.

7. **C –** refers to the ID code. Code ‘0’ is default and codes ‘1’ and ‘2’ are codes are used for the TWO MEN MODE. Code ‘3’ is used for the ARM/DISARM function and code ‘4’ is assigned for lost cards.

8. **MA –** refers to the Operating Mode that the new cardholder will use on Reader#1 (*i.e.* the built-in reader). If you enter ‘1’ for MA, for example, this card holder will be able to gain access using his or her ID only.
   - **‘0’ –** Depend on System Operating Mode ([**F1 SETUP MENU**] > [**READER#1 MODE**])
   - **‘1’ –** ID Only Mode
   - **‘2’ –** ID + Fingerprint (Password)
   - **‘3’ –** ID + Password + Fingerprint

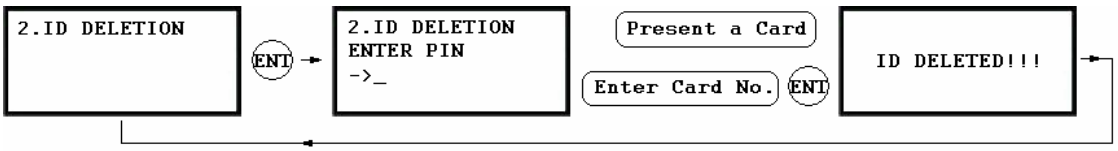
9. **MB –** refers to the Operating Mode that the new cardholder will use on Reader#2 (Exit Reader).
   - **‘0’ –** Depend on System Operating Mode ([**F1 SETUP MENU**] > [**READER#2 MODE**])
   - **‘1’ –** ID Only Mode
   - **‘2’ –** ID + Password Mode

   NOTE: You cannot apply the ID + Password Mode if Reader#2 does not have a keypad or does not use password verification.

10. **LV –** refers to the Output Operating Level for the new cardholder. Output operating time can be set for each user. To define an output operating time for each level, refer to the instructions on Output Setting in the [**F6 SETUP MENU**].
    - **'0' or '1' –** Level #1
    - **'2' –** Level #2
    - **'3' –** Level #3
    - **'4' –** Level #4

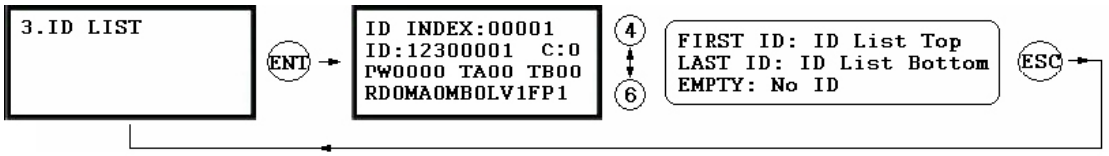
11. **FP –** is the Fingerprint Usage Flag (1 digit). You can decide whether or not the user will use a fingerprint.
    - **'0' –** Not using a fingerprint
    - **'1' –** Using a fingerprint

12.7.2 ID Deletion



Registered IDs can be deleted from the LX007 by presenting the card or entering the ID number. After entering the ID DELETION mode, present the card you want to delete. Alternatively, you may enter an 8 digit ID number and press <ENT> key from the keypad. The ID number will appear on the LCD and that ID will be removed from the device and the "ID DELETED" message will be shown on the LCD. If the ID number is not

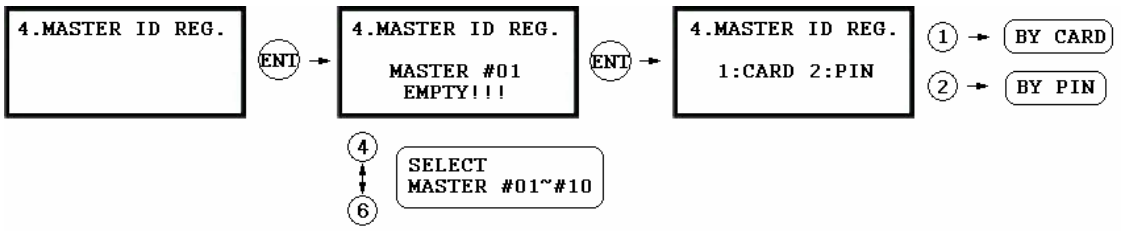
12.7.3 ID List



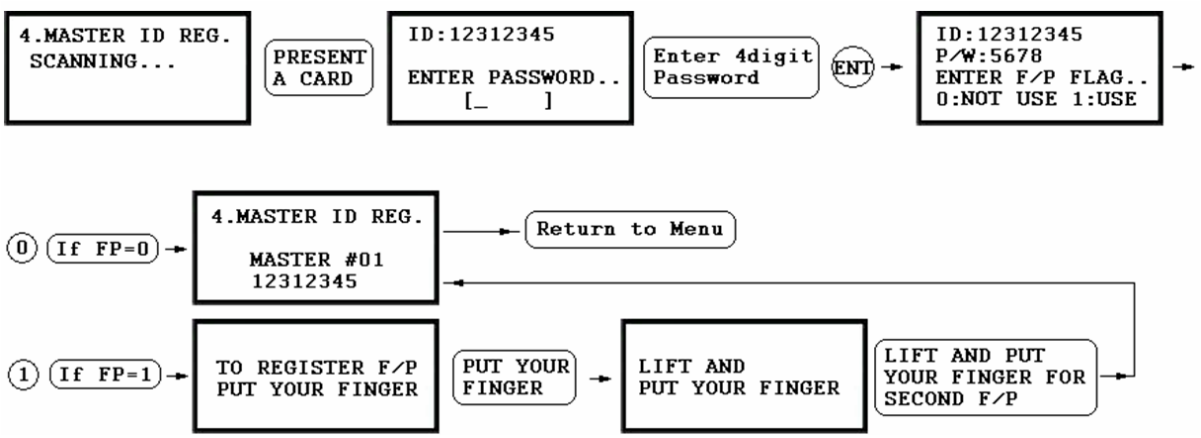
✓ The LCD will display the 5-digit ID Index, 8-digit ID number, 4-digit Password, Timeschedule for Reader#1(TA) and Reader#2(TB), ID code(C), accessible Readers(RD), operating mode for Reader#1(MA) and Reader#2(MB), the output level(LV) and usage of Fingerprint(FP) for each user.

✓ The "EMPTY" message will appear if there is no registered user ID.

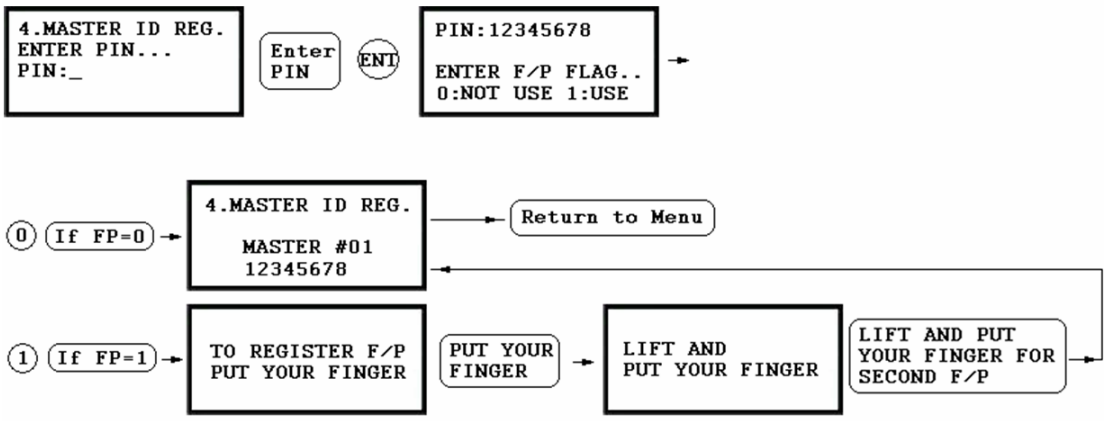
12.7.4 Master ID Registration



MASTER ID REGISTRATION BY CARD



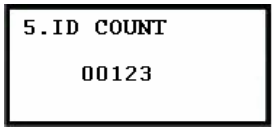
MASTER ID REGISTRATION BY PIN



The default Master ID is “00000000” (or “0000000000” for LX007SR) without a fingerprint. Up to 10 Master IDs (from “01” to “10”) can be stored in LX007.

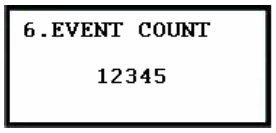
NOTE: To delete a Master ID, enter “00000000” (or “0000000000” for LX007SR) in the Master ID

12.7.5 ID Count



The number of registered user IDs is displayed. This count automatically increases or decreases as new IDs are registered or old IDs are deleted. The LCD in the left picture shows that the total of 123 user IDs are registered in th

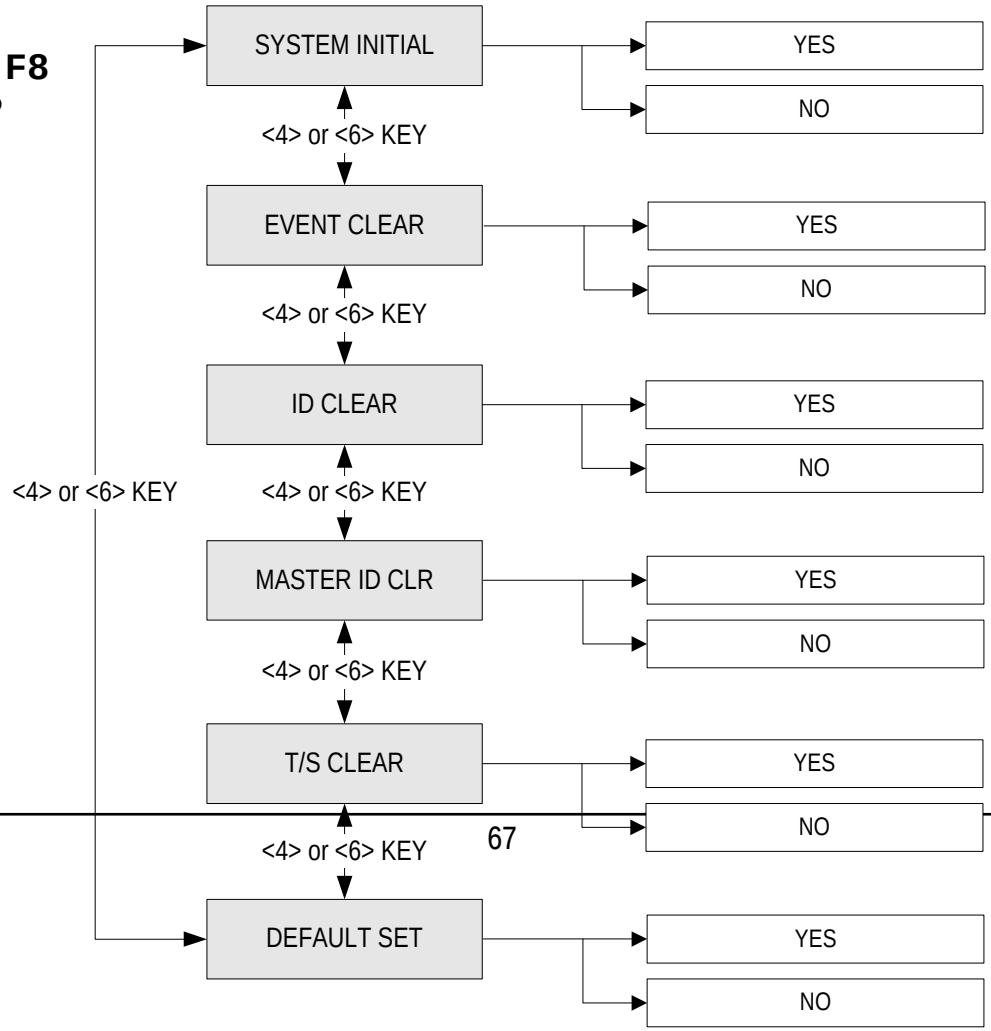
12.7.6 Event Count



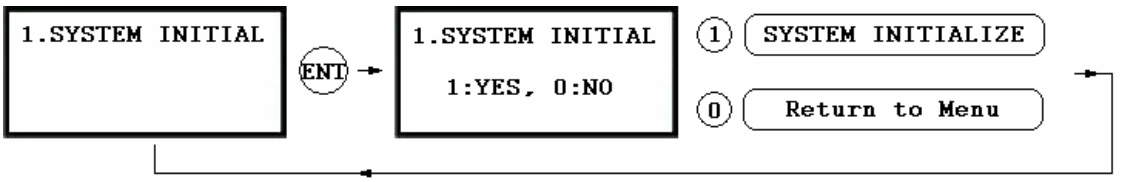
The LCD displays the total number of events stored in the memory. The count automatically increases as a new event is recorded in the memory. The LCD in the left figure shows that a total of 12345 Events are stored in the memory.

✓ Up to 20,000 event buffers are available. When stored events are

12.8 F8 SETUP MENU



12.8.1 System Initialize

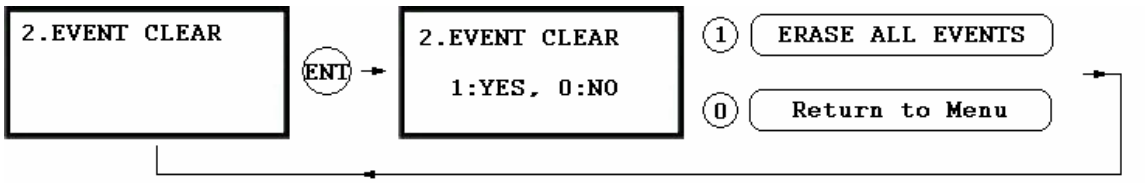


This operation is used to initialize the LX007 system. Press <ENT> key for initialization (when installing LX007 first or when resetting the system in the event of malfunction).

CAUTION: Initializing will erase all stored data in he memory.

✓ Press the <1> key to initialize or <0> key to cancel

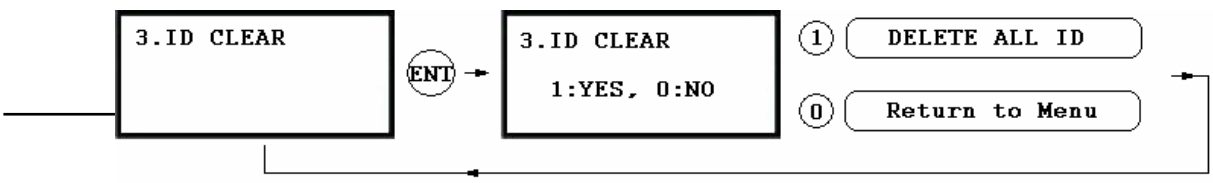
12.8.2 Event Clear



If the event memory is full, you can clear the event memory here. Press <ENT> key, then press <1> key to clear event memory or <0> key to cancel the operation.

CAUTION: Before you clear the events, make sure if the stored events are unnecessary. If you need to keep the event data, please upload the data to the host PC, otherwise, you

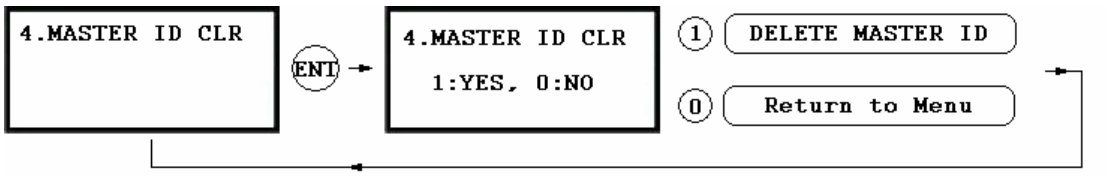
12.8.3 ID Clear



When you want to delete all the stored User IDs, you can do so in this menu item. Press <ENT> key first, then press <1> key to clear all the registered User IDs or <0> key to cancel the operation.

CAUTION: Before clearing all the User IDs, make sure that the registered User ID is no longer used or necessary; otherwise you may lose all the

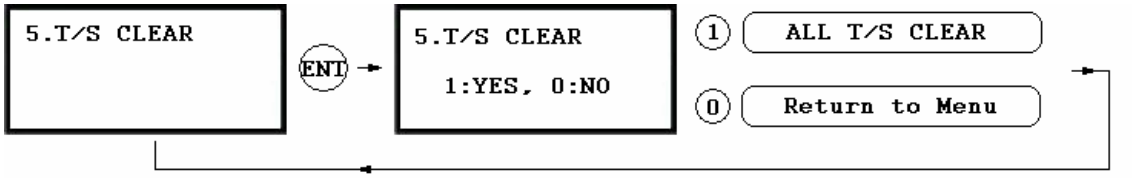
12.8.4 Master ID Clear



To delete all Master IDs, press <ENT> key first, then press the <1> key to clear all of the Master IDs or <0> key to cancel the operation.

CAUTION: Before clearing all Master IDs, make sure that registered Master IDs are no longer

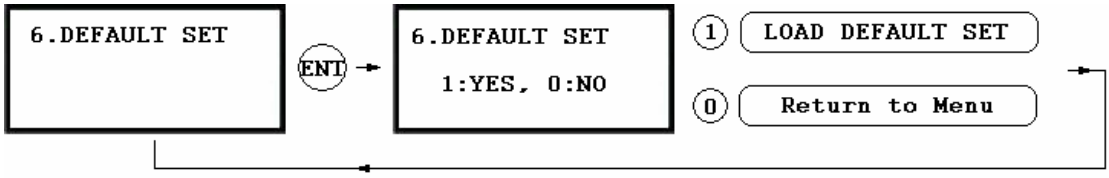
12.8.5 Time Schedule Clear



When you want to delete all the Time Schedules (01~10), Holiday schedules(01~10), Holiday code, Reader#1 Mode Time Schedule code and Reader#2 Mode Time Schedule code, you can clear them from the memory here. Press <ENT> key first and press the <1> key to clear all T/S or <0> key to cancel the operation.

CAUTION: Before you clear all Time Schedule data, make sure that the stored Time Schedule data are no longer used or necessary; otherwise

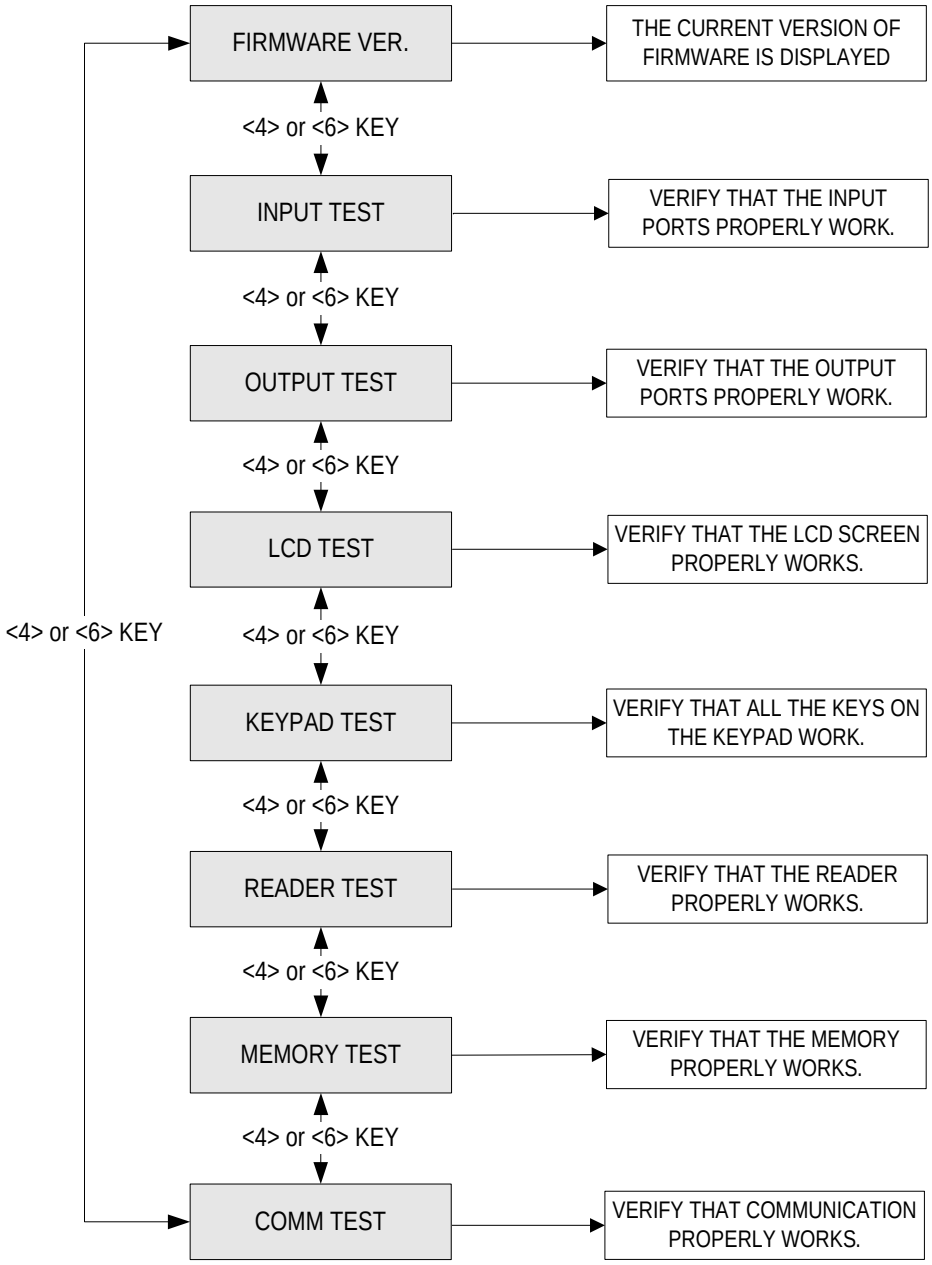
12.8.6 Default Setting



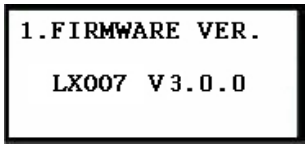
Here, you can restore the default settings of the LX007, if necessary. Press <ENT> key and press <1> key to restore the default setting values for all menus and or <0> key to cancel the operation.

CAUTION: Before restoring default values for all settings such as Reader Mode, COMM Address etc, make sure that the stored setting values are not necessary; otherwise, you may lose

12.9 F9 SETUP MENU

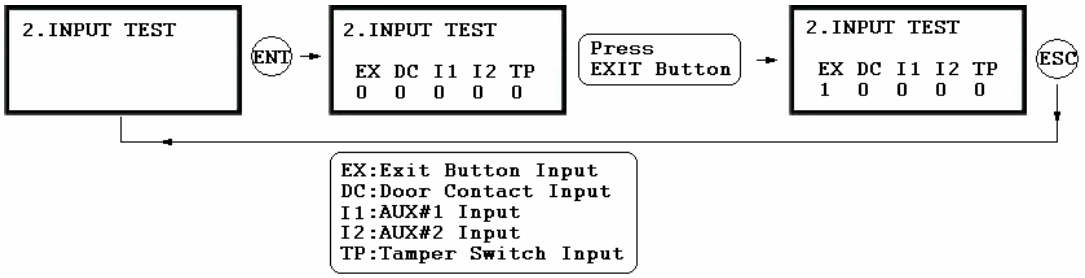


12.9.1 Version Check



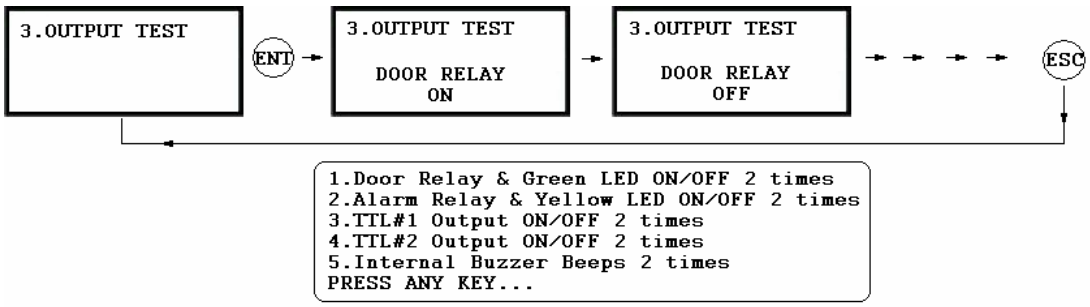
The Firmware Version of the unit is displayed on the LCD. Press <**4**> or <**6**> key to see other items of the menu on

12.9.2 Input Test



The 5-digit number shows the input status, where "0" indicates that the input port is open circuit, and "1" indicates that the input port is short circuit to the

12.9.3 Output Test

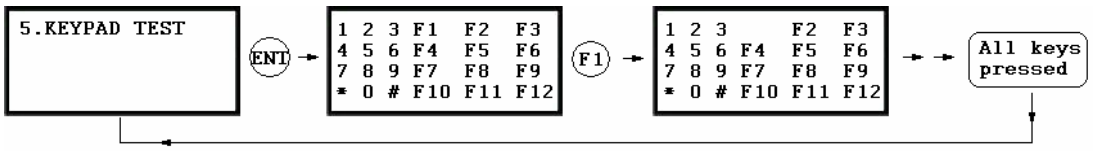


The first two tests verify the output relays (Door Relay and Alarm Relay) are working properly. You can hear the mechanical sound of relays and see the LED blink. The next two tests are to verify TTL#1 and

12.9.4 LCD Test

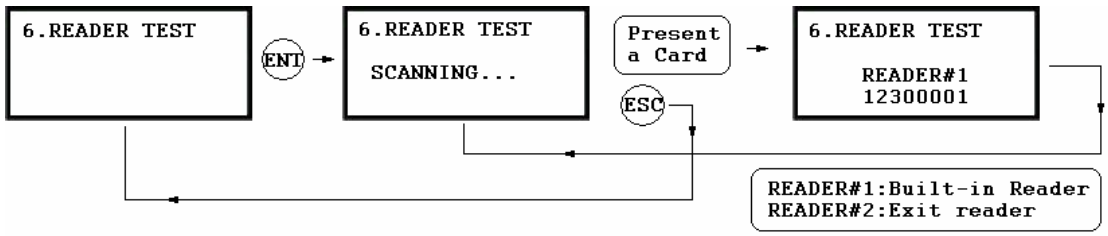
The LCD will display test screens. When the test is over, the LCD will show the "LAST UPDATE PRESS ANY

12.9.5 Keypad Test



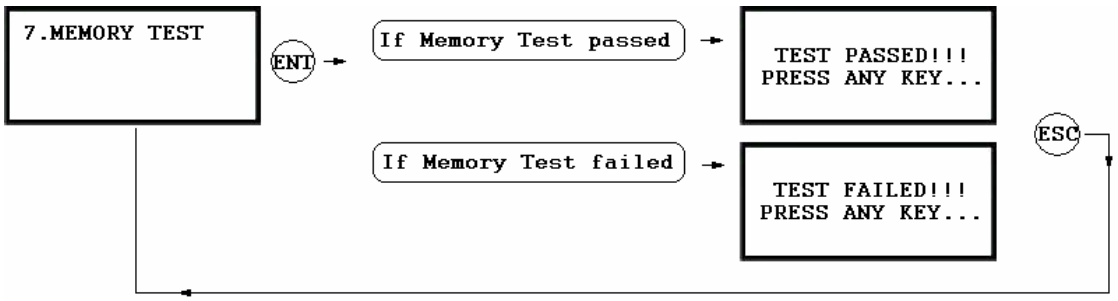
The LCD will display all the keys on the keypad. Press each key one by one and the depressed key will disappear from the screen. Note that ENT key is

12.9.6 Reader Test



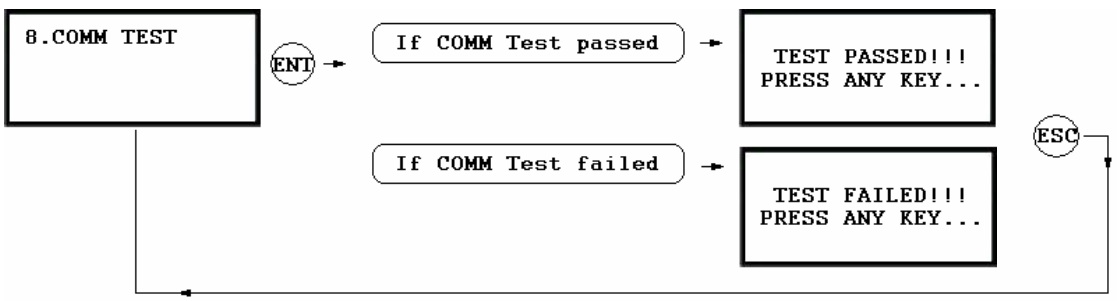
The LCD will display “Scanning…”, which means the LX007 is waiting for a card to be presented. Present a card to one of the readers. When the reader successfully reads the card, the LCD displays the Reader number and the 8-digit (or 10-digit for LX007SR) card number

12.9.7 Memory Test



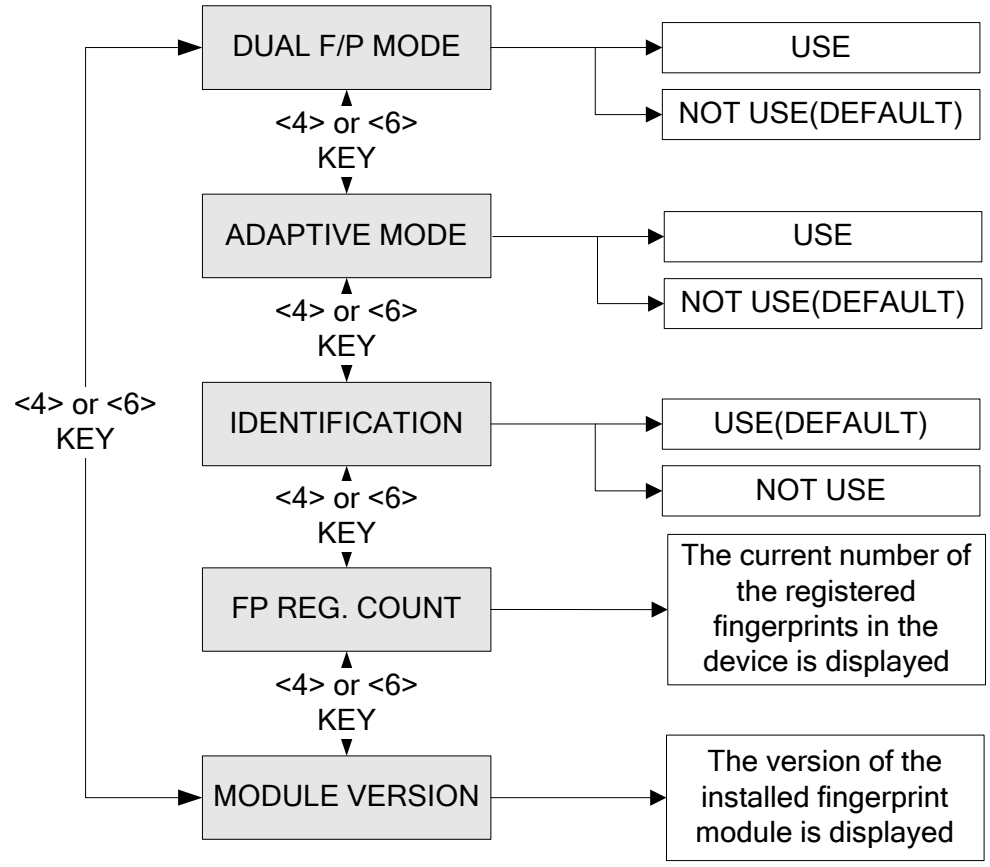
If the Data Memory has a problem, the LCD will show the “TEST FAILED” message. If this is the case, contact

12.9.8 Communication Test

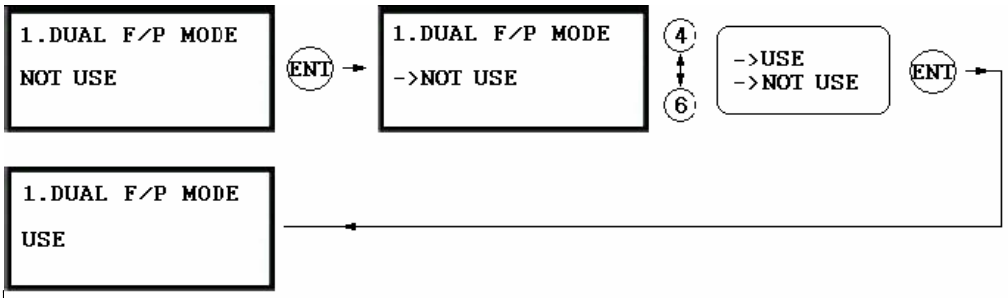


- ✓ You can test whether the communication works properly or not. Before executing this test, remember to connect the RS232 TX wire (Black wire with White stripe) and the RS232 RX wire (Red wire with White stripe) together.
- ✓ If the communication is malfunctioning, the LCD will show the “TEST FAILED” message. If this is the case, check the communication settings and try again.
- ✓ If the communication is working properly, the LCD

12.10 F10 SETUP MENU



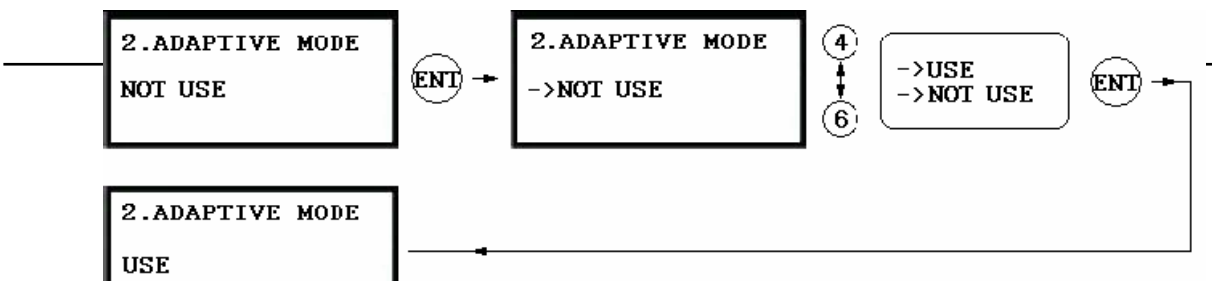
12.10.1 Dual Fingerprint Mode



If you set Dual finger mode to 'USE ', you can register 2 different fingers for your ID so that if one finger is injured, you may verify your ID with the other registered finger.

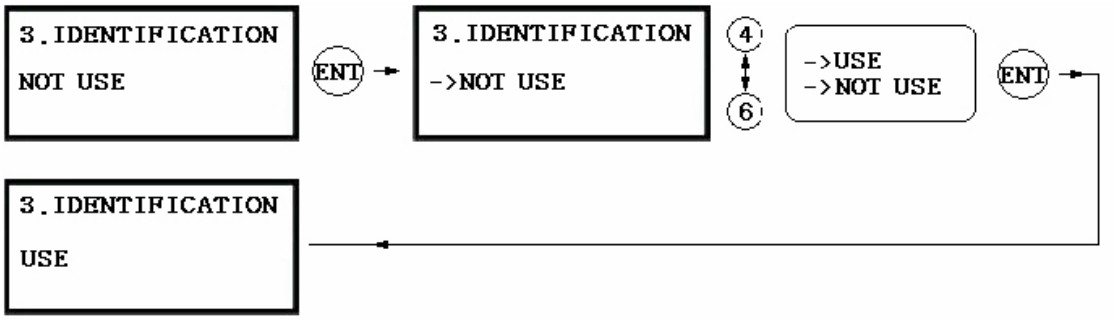
DUAL FINGER ?	Number of Templates and Fingers	Authentication Success Ratio	Recommended Authentication Mode
NOT USE	2 storage templates for a single finger.	High	Identification Mode
USE	1 storage template each for 2 different fingers.	Low	Verification Mode

12.10.2 Adaptive Mode



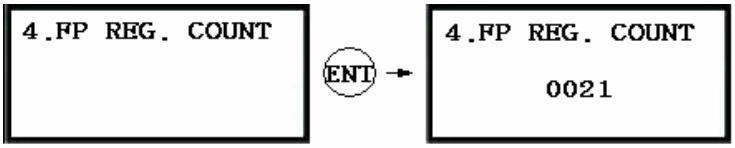
In **ADAPTIVE MODE**, the LX007 automatically improves the quality of fingerprint pictures, guaranteeing a higher likelihood of successful authentication. However, the

12.10.3 Identification Mode



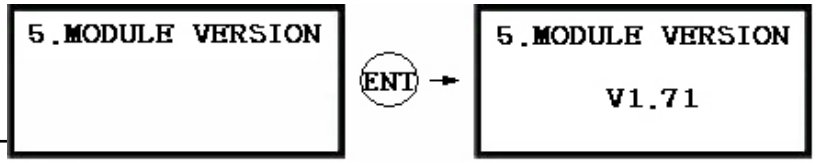
When the LX007 is configured in **IDENTIFICATION MODE**, it can perform the 1:N identification, which means users only need to have their fingerprint identified and the LX007 will match their fingerprint image against all the stored fingerprints. Users will not need to carry

12.10.4 FP Reg. Count



The number of registered fingerprints is displayed.

12.10.5 Module Version



The version of the fingerprint module is displayed.

APPENDIX

A. THE RELATION BETWEEN INPUT AND OUTPUT (DEFAULT)

Default Output Settings for Input Sources

OUTPUT	Door Relay (DR)	Alarm Relay (AR)	TTL#1 (T1)	TTL#2 (T2)	Buzzer (BZ)
[1] EXIT BUTTON	03	00	00	00	00
[2] DOOR CONTACT	00	99	00	00	00
[3] AUX Input #1	00	00	00	00	00
[4] AUX Input #2	00	00	00	00	00
[5] TAMPER ALARM	00	99	99	99	99
[6] CUT OFF ALARM	00	00	00	00	00
[7] DURESS ALARM	00	00	00	00	00
[8] ARM/DISARM OUT	00	00	00	00	00
[9] DOOR TIME OUT	00	99	00	00	00
[10] OUTPUT TIME SCHEDULE	00	00	00	00	00
INPUT	Exit Button (EX)	Door Contact Sensor (DC)	Aux Input #1 (I1)	Aux Input #2 (I2)	Tamper Switch (TP)
[11] INPUT TIME SCHEDULE	00	00	00	00	00
[12] CUT OFF CHECK	00	00	00	00	00
[13] INPUT TYPE	00	00	00	00	00

** Index No. [1] - [9]*

The values indicate the operating time of each output for the input signal.
99 denotes “forever”.

** Index No. [10]*

The values indicate the time schedule code (index) applied to each output.

** Index No. [11]*

The values indicate the time schedule code (index) applied to each input.

** Index No. [12]*

The values indicate whether or not to use the cut off check feature for each input.
(0 – NOT USE, 1 – USE)

** Index No. [13]*

The values indicate whether the input type is NO(Normally Open) or NC(Normally Closed).
(0 – NO, 1 – NC)

Default Output Settings for Input Circumstance

INPUT \ OUTPUT	Door Relay (DR)	Alarm Relay (AR)	TTL#1 (T1)	TTL#2 (T2)	Buzzer (BZ)
[1] Reader#1 ID OK LV1	**03**	00	00	00	00
[2] Reader#1 ID OK LV2	**05**	00	00	00	00
[3] Reader#1 ID OK LV3	**05**	00	00	00	00
[4] Reader#1 ID OK LV4	**05**	00	00	00	00
[5] Reader#1 ID Error	00	**03**	00	00	00
[6] Reader#1 T/S Error	00	**03**	00	00	00
[7] Reader#1 APB Error	00	**03**	00	00	00
[8] Reader#2 ID OK LV1	**03**	00	00	00	00
[9] Reader#2 ID OK LV2	**05**	00	00	00	00
[10] Reader#2 ID OK LV3	**05**	00	00	00	00
[11] Reader#2 ID OK LV4	**05**	00	00	00	00
[12] Reader#2 ID Error	00	**03**	00	00	00
[13] Reader#2 T/S Error	00	**03**	00	00	00
[14] Reader#2 APB Error	00	**03**	00	00	00

** Index No. [1] - [14]:* The values indicate the operating time of each output for the input signal.

B. TROUBLE SHOOTING

☞ A valid card became unregistered after batch-downloading IDs from PC.	
Cause	Wrong download procedure or a component defect.
Solution	1. The card ID might be registered only on the controller and not on the PC. During the process of batch-downloading IDs from the PC, the LX007 first erases the ID memory in it. That's why this deletion of certain IDs can happen if those IDs were not registered on the PC at the point of batch-downloading. 2. Check whether the card ID is registered in the PC or not. 3. If not, please register the number and try downloading again. 4. If the trouble remains after following the procedures above, contact a designated service center.

☞ I entered the Master ID "00000000" but I still cannot enter the Setup Mode.	
Cause	The Master ID might have been changed or some components are defective.
Solution	1. Try changing the Master ID through the application software. (The Master ID will be changed to the default value "00000000".) 2. When it is not feasible, initialize the unit as following: After the installation and connections are completed, supply power (+12V DC) to the LX007 with the initialization button being held down. Then, the LCD will first display "**Initialize OK? 1:Yes 0:No**". Press <1> key if you want to initialize the system. After all the initialization process is completed, the system will be operating on the normal mode and the LCD will display "**IDTECK, LX007 [F1], Date Time**". 3. If the trouble persists after following the procedures above, contact a designated service center.

☞ No problem with accessing by card, but cannot access via a manual PIN input.

Cause	An error in the settings or possible component defect.
Solution	1. Check whether a beep sounds when you press a key. If a beep sounds, the problem may be wrong settings. Proceed as followings: - Enter the Master ID (Default="00000000") to get into the Setup mode. - Press <F2> key. - [LANGUAGE] will appear on the LCD, then use the <6> key to choose [RD1_PIN_INPUT] and press [ENT] key to modify the value to 'USE' by using <4> or <6> key. 2. When there is no beep sound or the problem persists after the keypad has been enabled, contact a designated service center.

☞ The unit suddenly returns from Setup Mode to normal operating mode.	
Cause	Time-out error
Solution	The LX007 is originally programmed to go back to the normal operating mode when no keys are pressed or no cards are read within 60 seconds.

☞ The buzzer keeps beeping; "beep~ beep ~ beep" or "beeeeeeeep~~~~".	
Cause	An error in the Installation, Door status or Internal circuits.
Solution	1. Check the door status. It occurs when the door is opened over 3 sec (Default). 2. Check the door contact sensor type: it must be NO/NC-type. 3. Check the 10 Time schedule code (01-10) values of output T/S, in [7. OUTPUT T/S] of F6 Setup Menu. This problem can occur if the time schedule code is set between 01 and 10 and the present time is within the time zone of the selected schedule. If the wrong time schedule is selected, cancel it by assigning the blank time schedule code "00" 4. Check the Tamper switch of the LX007. 5. If the trouble persists after checking the above, contact a designated service center.

☞ The "SCHEDULE ERROR" message appears when an RFID card is read.

Cause	An error in RFID card registration, time schedule setting or the system itself.
Solution	1. If the LX007 used to be properly operating before, it is likely that there has been an electric shock that damaged the internal memory and data. Please initialize the unit as instructed in the manual. 2. Check if the ID information has been configured incorrectly. * Register ID again and check the following points. - In order to restrict access of a user within a specific time zone as instructed in the manual, register time schedule in advance and apply the time schedule code(1-10) to the user during the registration process. - In order to allow the user to access at all times, enter “00”. 3. Use the software for time schedule settings if the LX007 is connected to a PC. Refer to the software manual for more details. 4. If the trouble persists after checking the above, contact a designated service center.

☞ The “ACCESS DOOR ERR” message appears when an RF ID card is read.	
Cause	Incorrect user setting or something wrong with internal circuits.
Solution	1. If the LX007 used to operate properly before, it is likely that there has been an electric shock that damaged the internal memory and data. Please initialize the unit as instructed in the manual. 2. Check if the ID information has been entered incorrectly during its registration. * Register the ID again and check the following points: - Since the controller has two reader ports, set the “RD” setting – the door to which the user will be allowed access – to an appropriate value. - If the RD value is set to “1”, the door opens only when Reader 1 reads a card. If the card is presented to Reader 2, the “ACCESS DOOR ERROR” message will appear. - If the RD value is set to “2”, the door opens only when Reader 2 reads a card. If the card is presented to Reader 1, the “ACCESS DOOR ERROR” message will appear. - If the RD value is set to “0” or “3”, both the reader 1 and 2 will open their doors when a registered card is presented to them. 3. If the trouble persists after checking the above,

	contact a designated service center.

☞ The communication between the LX007 and the Host PC fails.	
Cause	A defective cable may be being used or there have been errors in wiring, the COMM ID setting for the controller, or damage on the communication port (either on the PC side or the controller side).
Solution	1. Please check the settings of the application software and the controller. - Check if the COMM ID of the controller is listed on the application software. - Set the different COMM ID when two or more controllers are installed. - Check if the communication speed (9600bps is default) is the same as the setting on the software. - Make sure that the PC's COM port is set correctly on the S/W. - The parameters in the software should be set as following: Parity bit : NONE Data bit : 8 bits Stop bit : 1 bit 2. Check the wiring for communication.

RS232		RS485 (mono)		
LX007	PC	LX007	RS485/232 Converter	PC
RX	TX	RTX(-)	RTX(-)	The RS232 cable from the converter
TX	RX	RTX(+)	RTX(+)	
GND	GND			

RS485(Multi Drop)			
LX007	LX007	RS485/232 Converter	PC
RTX(-)	RTX(-)	RTX(-)	The RS232 cable from the Converter
RTX(+)	RTX(+)	RTX(+)	

3. We recommend you use line-end resistors of 120 Ohm between the RTX (+) and RTX (-) wires when you are using the long-distance RS485 communication. Apply the same resistors to the Converter RS485 wires. Consult a service center or an electric technician if you are not sure how to do it.

	4. When a multi-drop communication doesn’t work, test one-to-one communication first. 5. If the trouble persists after following the procedures above, contact a designated service center.

FCC REGISTRATION INFORMATION

FCC REQUIREMENTS PART 15

Caution: Any changes or modifications in construction of this device which are not expressly approved by the manufacturer for compliance could void the user's authority to operate the equipment.

NOTE: This device complies with **Part 15 of the FCC Rules**.

Operation is subject to the following two conditions;
1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a **Class A Digital Device**, pursuant to **Part 15 of the FCC Rules**. These limits are designed to this equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the radio or television off and on, the user is encouraged to try to correct interference by one or more of the following measures.

1. Reorient or relocate the receiving antenna.
2. Increase the separation between the equipment and receiver.
3. Connect the equipment into an outlet on another circuit.
4. Consult the dealer or an experienced radio/TV technician for help.

Warranty Policy and Limitation of Liability

IDTECK warrants this product against defects in material and workmanship for 2 years from the date of purchase under normal customer use. This Warranty doesn't apply: 1) to any product which has been dismantled without authorization of IDTECK or/and has a damaged or detached QC label on its back side; 2) to any losses, defects, or damages caused by improper testing, operation, installation, maintenance, modification, alteration, or adjustment; 3) to any product with a damaged or faded serial number on it; or 4) to any losses, defects, or damages caused by lightning or other electrical discharge, natural disaster, misuse, accident or neglect.

This Limited Warranty is in lieu of all other warranties, obligations, or liabilities on the part of IDTECK, and IDTECK DISCLAIMS ANY AND ALL WARRANTY, WHETHER EXPRESS OR IMPLIED, OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.IDTECK does not, and cannot, know who is present, what property is located, where this product will be used; it would be extremely difficult to determine the actual damages that may result from a failure of the product to perform as anticipated; and the low price of this product is based upon the nature of the product provided and the limited liability that IDTECK assumes. IDTECK IS NOT RESPONSIBLE FOR ANY PERSONAL INJURY, PROPERTY DAMAGE OR LOSS, DIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES, OR OTHER LOSS, AND IDTECK'S MAXIMUM LIABILITY SHALL NOT IN ANY CASE EXCEED THE PURCHASE PRICE OF THE PRODUCT.

To obtain repair or replacement under the terms of this warranty, visit IDTECK's Website (http://www.idteck.com) and place an online RMA request. After an RMA code is issued, return the product along with the authorization RMA code.

>> Warranty Period

	Item	Warranty Period
1	RF READER / FINGERPRINT READER	2 years
2	RF CARD (Active type)	
3	STANDALONE CONTROLLER	
4	CONTROL PANEL	
5	FINGERPRINT CONTROLLER	

6	MOLDED RF READER (RF10, RF20, RF30, RF TINY, IP10, IP20, IP30, SR10E, SR10UE, SR10SE, SR10RWE, SR10BE)	Lifetime
7	RF CARD (Passive type) (IDC80, IDC170, IDK50, IMC125, LXK50, IPC80, IPC170, IPK50, ISC80, ISC80S, ISK50, IMC135, IHC80, IP100, IP200)	

RMA REQUEST FORM

Basically, IDTECK accepts only on-line RMA requests on our website (www.idteck.com). Please provide us with basic information in the below form so that we can understand your problems better. Send us back this form with your products after an RMA code is issued on the website. This form is not compulsory.

Authorization RMA Code :	
1. Company Name	
2. Model Name	
3. Serial No.	
4. Original Invoice No.	
5. Distributor	
6. Purchasing Date	
7. RMA Request Date	

Please check your problems

☐ Card Reading	☐ Power	☐ Keypad
☐ Communication	☐ Relay	☐ LCD
☐ LED & Buzzer	☐ Registration	
☐ Others :		

IDTECK RMA Customer Center >>

5F, Ace Techno Tower B/D, 684-1 Deungchon-Dong, Gangseo-Gu, Seoul 157-010, Korea
T. 82.2.2659.0055 / F.82.2.2659.0086

Website: www.idteck.com
e-Training Center: www.idtecktraining.com

The specifications contained in this manual are subject to change without notice at any time.

5F, Ace Techno Tower B/D, 684-1, Deungchon-Dong, Gangseo-Gu, Seoul, 157-030, Korea
Tel : +82-2-2659-0055
Fax : +82-2-2659-0086
E-mail : webmaster@idteck.com